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LECTURES

ON

COMPARATIVE ANATOMY;

IN WHICH ARE EXPLAINED

THE PREPARATIONS

IN

THE HUNTERIAN COLLECTION.

ILLUSTRATED BY ENGRAVINGS.

BY

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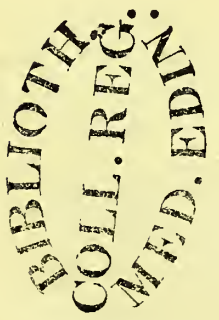
IN TWO VOLUMES.

VOL. II.



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— 127. The course of the small intestines with the cœcum, and the turns of the colon and the rectum of a small species of deer from Prince of Wales's Island.
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— 129. The course of the small intestine with the cœcum, the colon, and the rectum of the hog deer.
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— 131. The course of the small intestines, the cœcum, the colon, and the rectum of a common deer.
— 132. The course of the small intestines, the cœcum, the colon, and the rectum of the rein-deer.

THE Engravings contained in this Volume, illustrate many parts of the foregoing Lectures which do not admit of being explained by verbal descriptions, and without this illustration, would be very obscure.

Collected into their present form, they become so many distinct Series, in which the gradations of the structure of the same parts in different animals can be readily traced.

The Drawings from which the Engravings are taken, were, for the greater part, made by Mr. Clift, the Conservator of the Museum of the College, and under his eye the Engravings have been executed.

Whatever value these engravings possess as works of art, is much encreased by the faithfulness with which they represent the natural appearance of the parts from which they are taken.

EXPLANATION OF THE PLATES.

TAB. I.

A new species of actinia, or animal flower, from Barbadoes. This animal was found by the author on the south-east coast of the Island of Barbadoes, close to Charles Fort, about a mile from Bridge Town, in some shoal water separated from the sea by the stones and sand thrown up by a dreadful hurricane in the year 1780, which did much mischief to the island, and probably brought up the brain-stones and their inhabitants from the bottom of the bay.

Fig. 1. Shews the animal a little magnified, as it appeared immersed in spirits.

A. The under side of the body.

B B. The cartilages which attach the animal to the sides of the cavity in which it lies.

C. One of the cones covered by its membrane in a collapsed state.

D. The lowest spiral turn of the membrane and its tentacula spread out.

E E. The cut edges of the divided membrane, which are turned aside to shew the cone.

F. The cone, as it appears in the intervals between the spiral turns of the membrane.

TAB. I.

Fig. I.

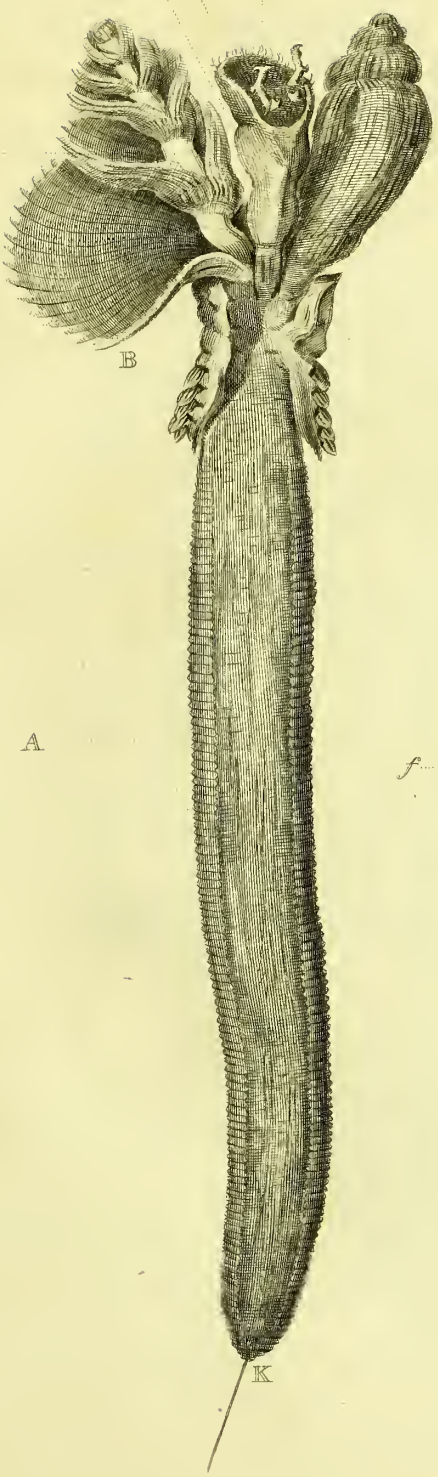
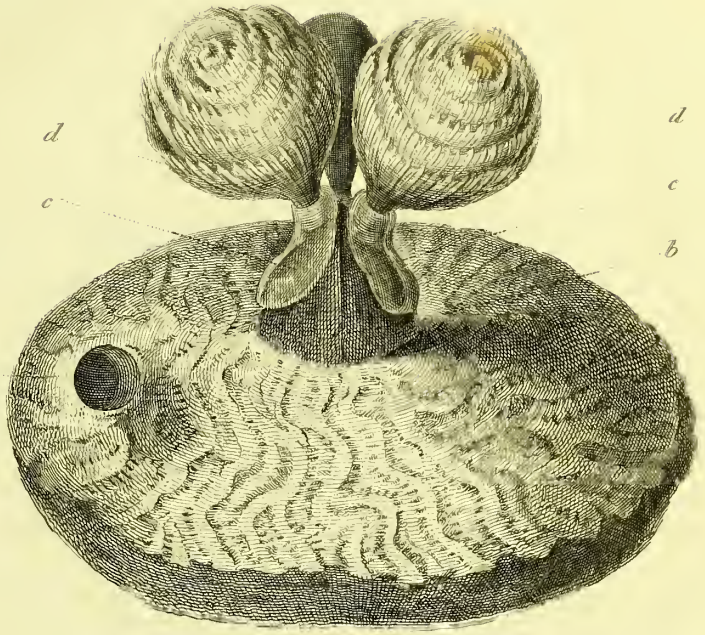


Fig. II.



G. The operculum.

H. The flattened end of the operculum with hair upon it.

I I. The two claws that arise from the surface of the operculum.

K. The anus, into which a hog's bristle is introduced.

Fig. 2. The animal with its tentacula expanded, as it appeared in the sea. This view of it is taken from a sketch made by the author in Barbadoes, where no draughtsman could be procured while the animal was alive. This also is larger than the animal.

a. The brain-stone by which the shell of the animal is inclosed.

b. The external prominent shell.

c c. A membrane, which is protruded along with the cones and opercnlum, and makes a fold over the edges of the prominent shell.

d d. The membranes and tentacula in a state of expansion.

e. The inner side of the operculum.

f. The tube in the brain-stone, as it appears when the prominent part is broken off.

The three following engravings show the mechanism, by means of which the hood of the cobra de capello snake is raised and depressed,

The parts are represented of the natural size.

TAB. II.

A back view of the neck of the cobra de capello snake, in the expanded state of the hood. The external skin is turned aside, to expose the muscles which raise the ribs, and bring the skin forwards towards the head.

A A. The scales on the head of the snake.

B B. The eyes.

C C. The muscles which surround the poison glands.

D D. A portion of the poison glands exposed.

E E. Muscles which have their origin in the neck, and terminate in the head,

F. Muscles which bring the head back.

G G. The skin divided in the middle line of the neck, and turned back on each side.

H H. The intercostal muscles near the spine.

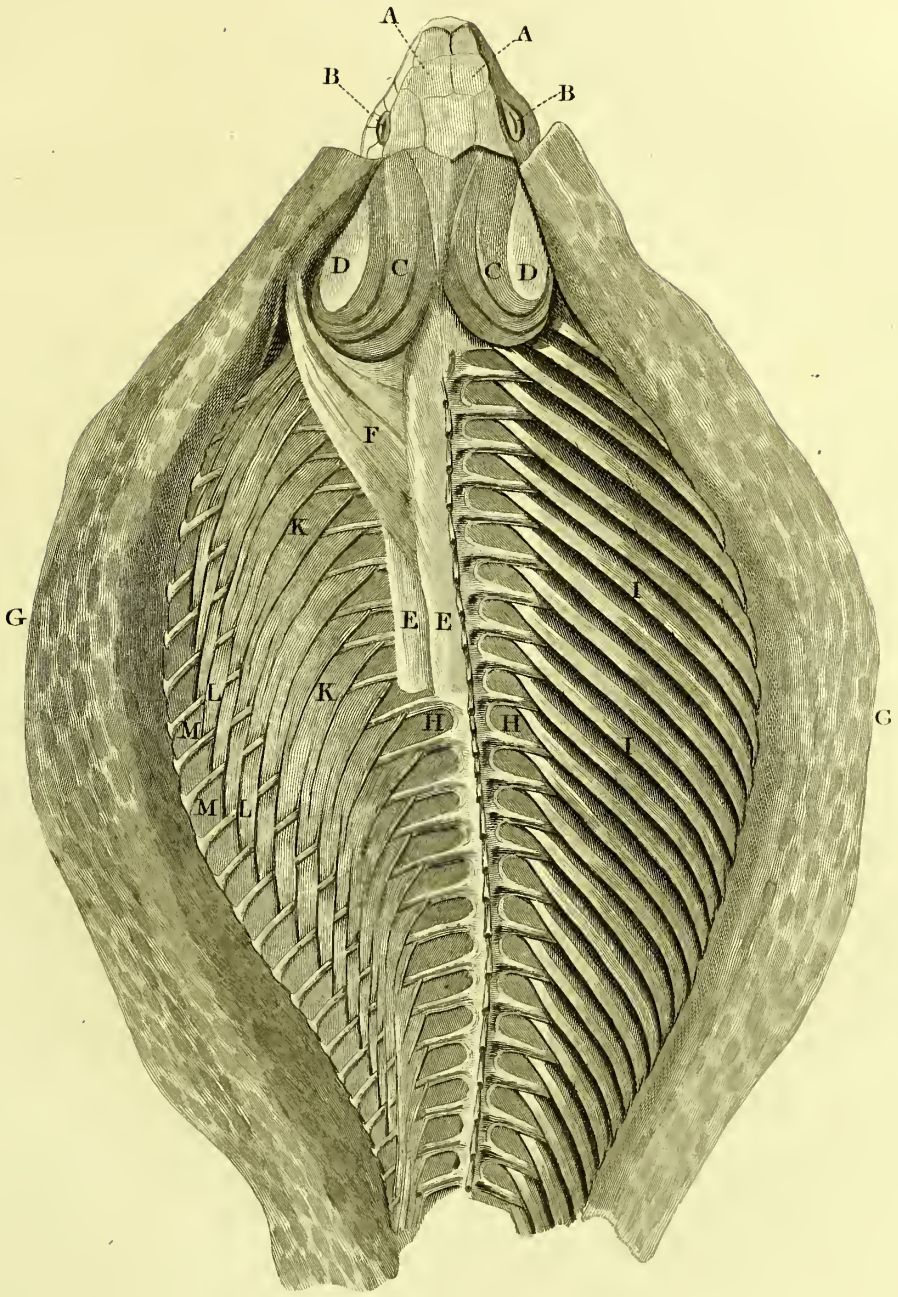
I I. The muscles which bring forward the skin of the back upon the neck, to form the hood; they arise from the ribs, and are inserted into the skin.

K K. Muscles which raise the ribs; they originate from that part of the rib near the spine, pass over two ribs, and are inserted into the rib below, near its extremity.

L L. Muscles which raise the ribs, arising from one rib, and passing over the next, to be inserted into the rib below.

M M. The intercostal muscles near the extremities of the ribs.

TAB. II.



TAB. III.

Front view of the neck of the cobra de capello; the parts are prepared so as to shew the ribs in their depressed state, and the muscles by which they are depressed; also those which bring the skin back into its ordinary state.

A A. The two portions of the lower jaw separated from each other, and turned aside.

B B. The poison fangs.

C C C. The ribs in their depressed state, lying on the side of the spine.

D D D. The ribs of the opposite side in their extended state; their extremities forming the boundary of the hood, and giving it an oval form.

E E. A pair of muscles, which bring the head forward upon the neck.

F. F. The intercostal muscles.

G G. The muscles which bring the ribs downwards upon the spine.

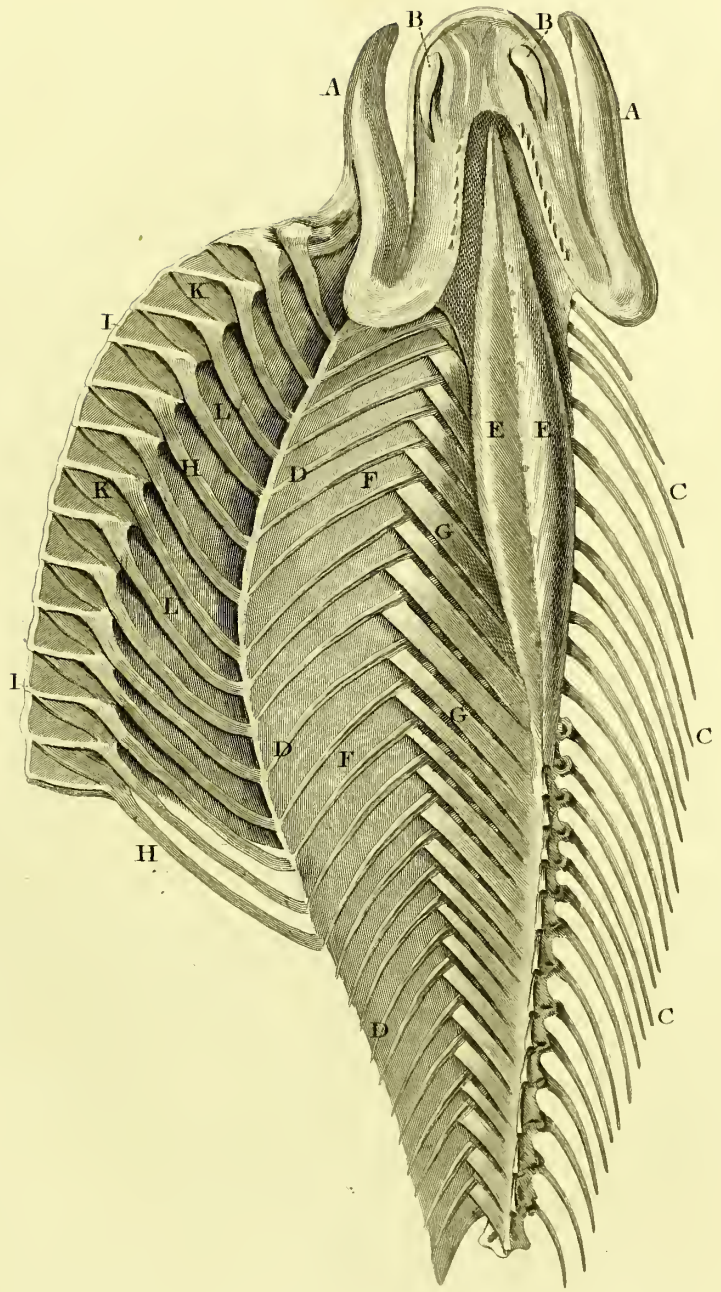
H H. The muscles which bring the skin backwards from the neck; they have their origin from the points of the ribs, and are inserted into the lower edge of the abdominal scuta.

I I. The abdominal scuta, divided in the middle line of the belly.

K K. The muscles which go from the lower edge of one scutum, to the lower edge of the scutum over it, to bring the scuta closer together, and make them overlap.

L L. An internal view of the skin of the snake, beyond the abdominal scuta.

TAB. III.



TAB. IV.

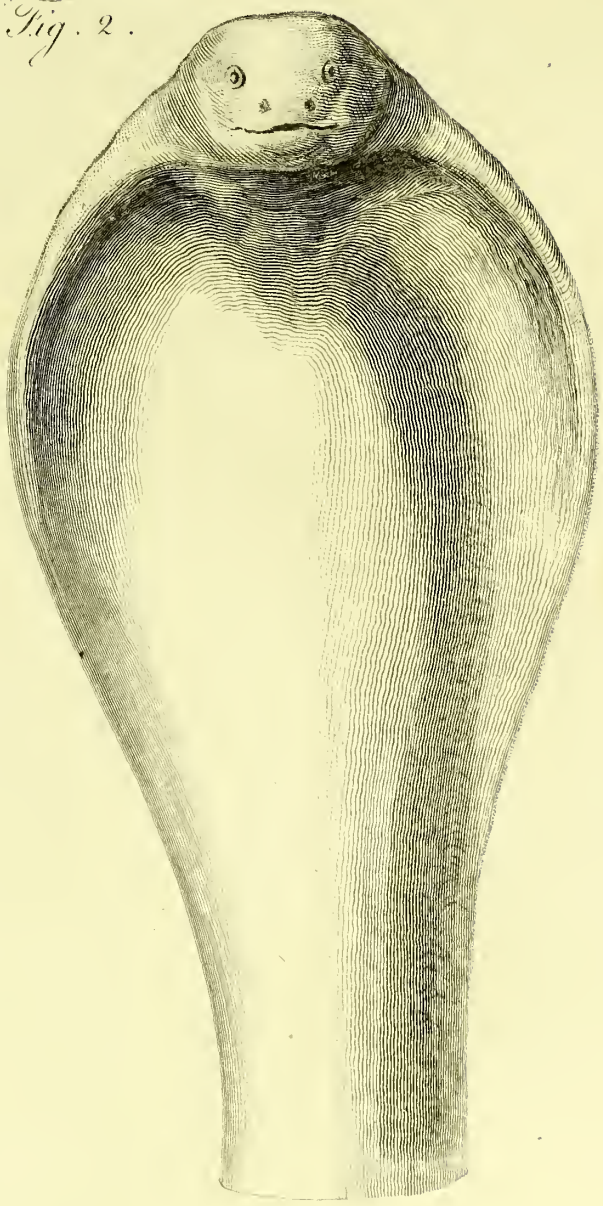
Fig. 1. A back view of the hood of the cobra de capello in its extended state.

Fig. 2. A front view of the extended hood.

These views were taken while this animal was alive.

Fig. 1.

Fig. 2.



TAB. V.

Front view of the pelvis of a female kanguroo, of the natural size, to shew the two bones belonging to the false belly.

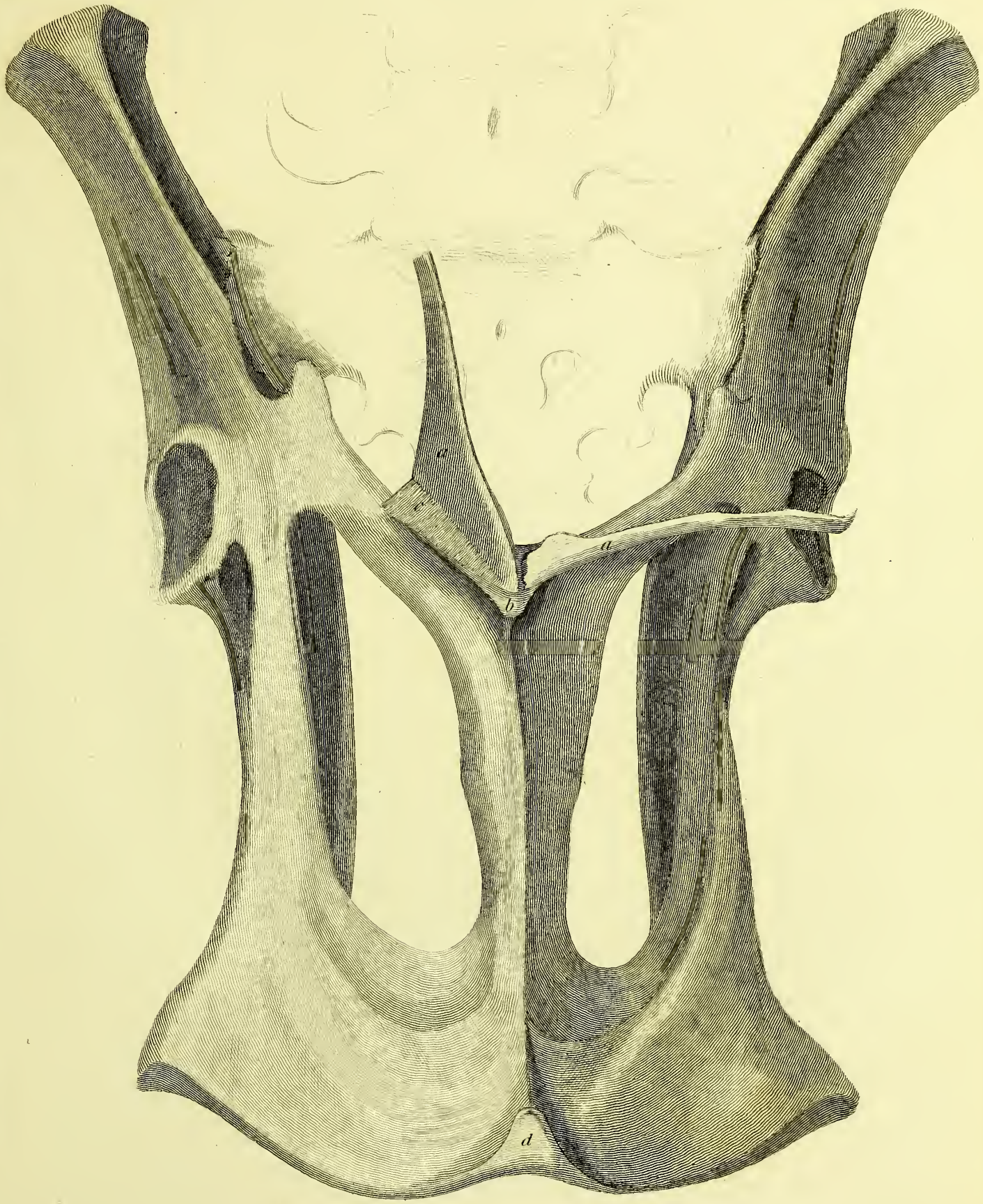
a a. The two bones, one in its most common position, the other bent down, to shew the extent of its motion.

b. The projection on which the small bones move.

c. A ligament, connecting the small bone to the ramus of the os pubis.

d. A projecting rounded convex surface, over which the pudendum is brought forward, to allow of the fœtus being deposited in the false belly.

TAB. V.



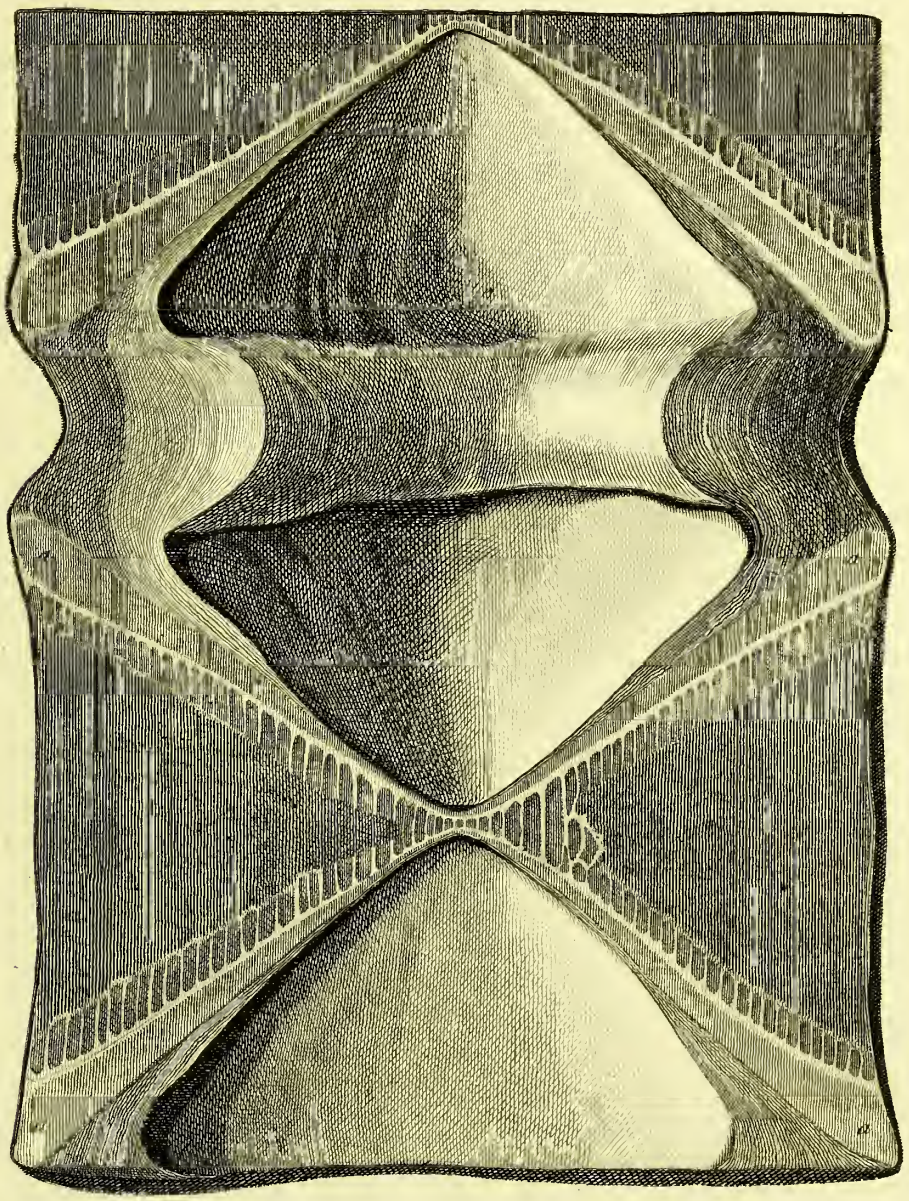
TAB. VI.

A longitudinal section of one of the intervertebral joints of the squalus maximus, after the fluid contained in the cavity had been evacuated, and the parts had been steeped in water: on a scale of two-thirds of an inch to an inch.

a a a a. The section of two vertebræ, to shew the mode in which the intervertebral cavities are formed. The vertebra itself is partly bone and partly transparent cartilage; the bony portion forms two cup-like cavities; and the intermediate substance consists of bony cells in form of lozenges, filled with cartilage. The cavity of the joint is represented in its contracted state; and the inner portion of the lateral ligaments, which is made up of thin layers of a loose texture, has its interstices loaded with water, which it had imbibed, and which makes it project into the cavity of the joint. This it did not do in the natural state.

The external layer of the ligament for the thickness of half an inch, is the only truly elastic part on which its strength depends.

TAB. VI.



Scale two thirds of an Inch to one Inch.

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Basire sc

TAB. VII.

A side view of the skull of the sea otter, nearly of the natural size, to show the articulation between the skull and lower jaw; the condyle of the jaw is almost completely confined in the cavity adapted for it in the basis of the skull, so as to prevent all lateral motion, and make the teeth, when the jaws are closed, always touch upon the same surfaces.

TAB. VII.

The three following engravings represent the mechanism, by means of which, snakes are enabled to employ their ribs for the purposes of progressive motion. Of the natural size.

TAB. VIII.

A lateral view of the muscles which move the ribs in the boa constrictor.

A A. The straight muscles of the back.

B B. The first set of muscles which arises from the transverse processes of each vertebra, and is inserted into the rib behind it close to its head.

C C. The second set.

D D. The third set.

E E. The fourth set.

F F. The fifth set.

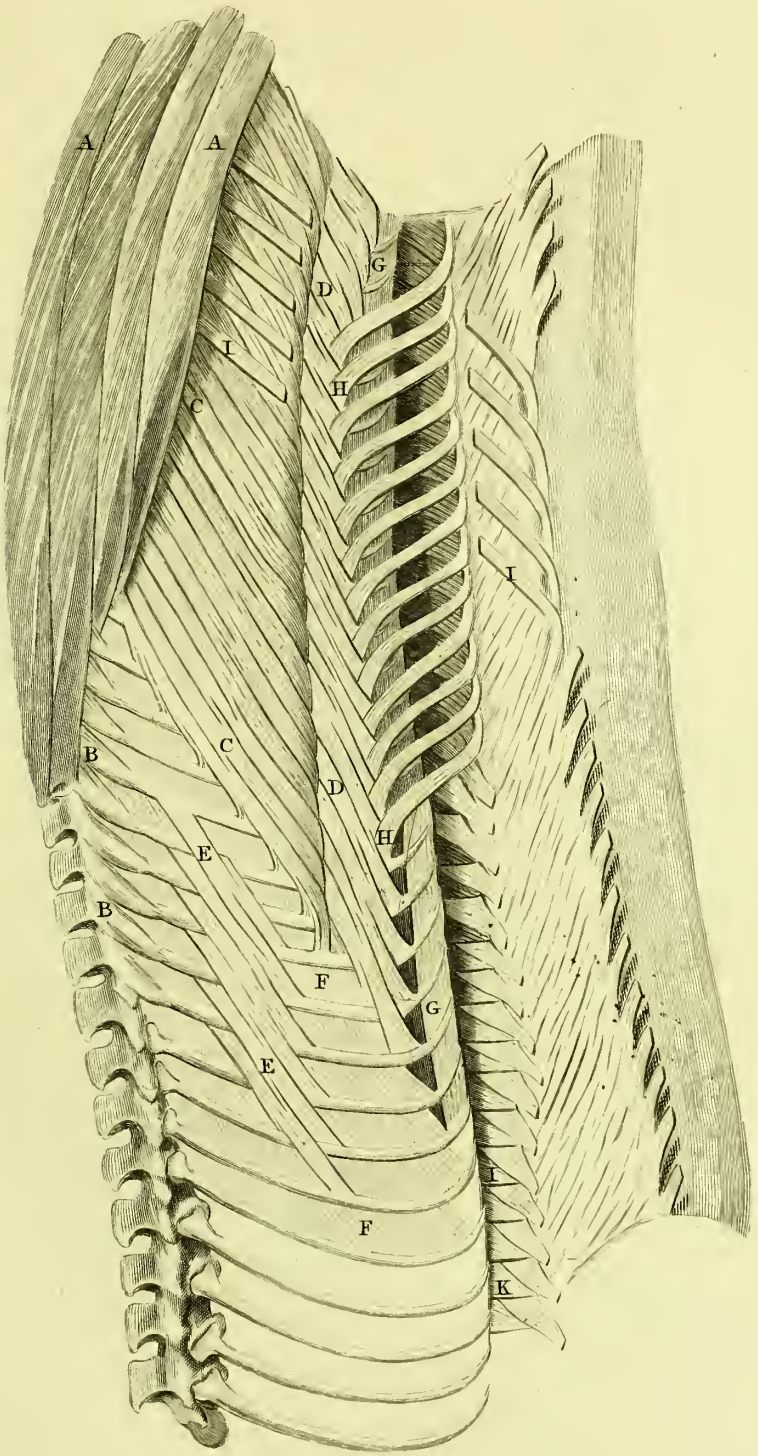
G G. Short muscles which pass from cartilage to cartilage.

H H. A set of oblique muscles, which pass from the anterior side of the bony extremity of each rib to the posterior edge of each scutum.

I I. Muscles which pass from the ribs near their heads obliquely backwards, to be inserted into the skin at the edge of each scutum.

K. Muscles of the scuta.

TAB. VIII.



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TAB. IX.

An internal view of the muscles which move the ribs in the boa constrictor.

A A. The muscles which pass from cartilage to cartilage of the different ribs.

B B. A set of muscles which pass from the point of each rib, over two ribs to the middle of the third.

C C. A similar set of muscles continued from the opposite side of the rib, passing over three ribs to the body of the vertebra.

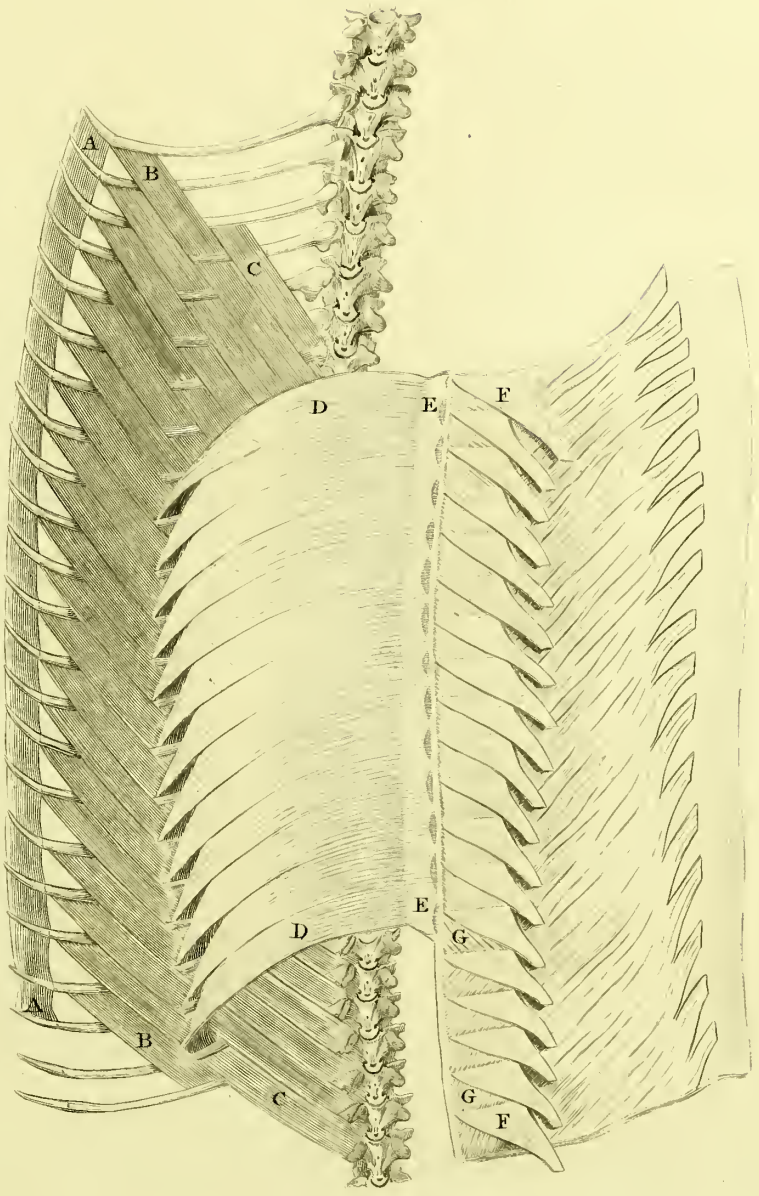
D D. The abdominal muscles which arise from the anterior edge of each rib, and pass to the linea alba.

E E. The linea alba.

F F. The terminations of the oblique muscles which pass from the bony extremities of the ribs, to the edges of the scuta.

G G. The muscles of the scuta consisting of two sets, which decussate each other.

TAB. IX.



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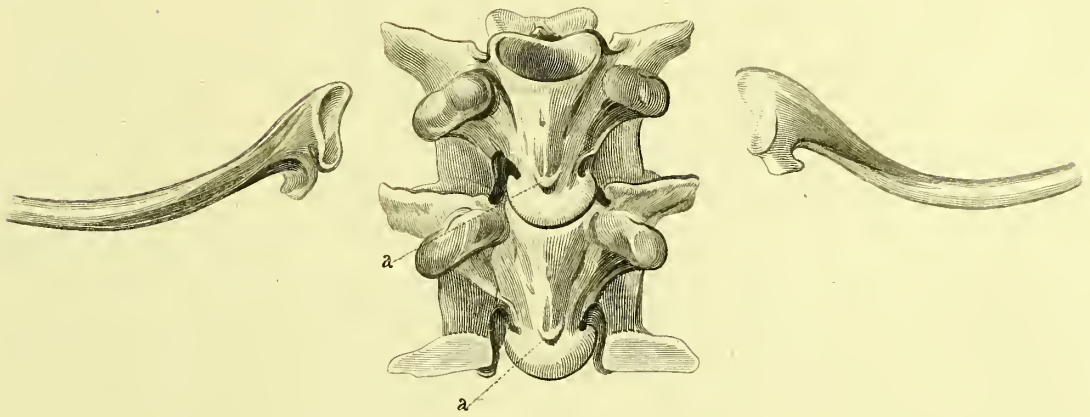
TAB. X.

Two vertebræ, and portions of two ribs of a large boa constrictor, to shew their articulating surfaces.

a a. The process for the attachment of the strong muscles which are employed in crushing the bodies of the animals, round which the snake entwines itself.

TAB. X.



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The fifteen following engravings form a series of the varieties met with in the structure of the stomachs of quadrupeds, by means of which they are fitted for the digestion of different kinds of food.

TAB. XI.

The stomach of the lynx nearly of the natural size inverted to shew its internal surface, and the division between the cardiac and pyloric portion.

a. The œsophagus, in which the internal membrane is thrown into folds in a transverse direction.

b b. The cardiac portion.

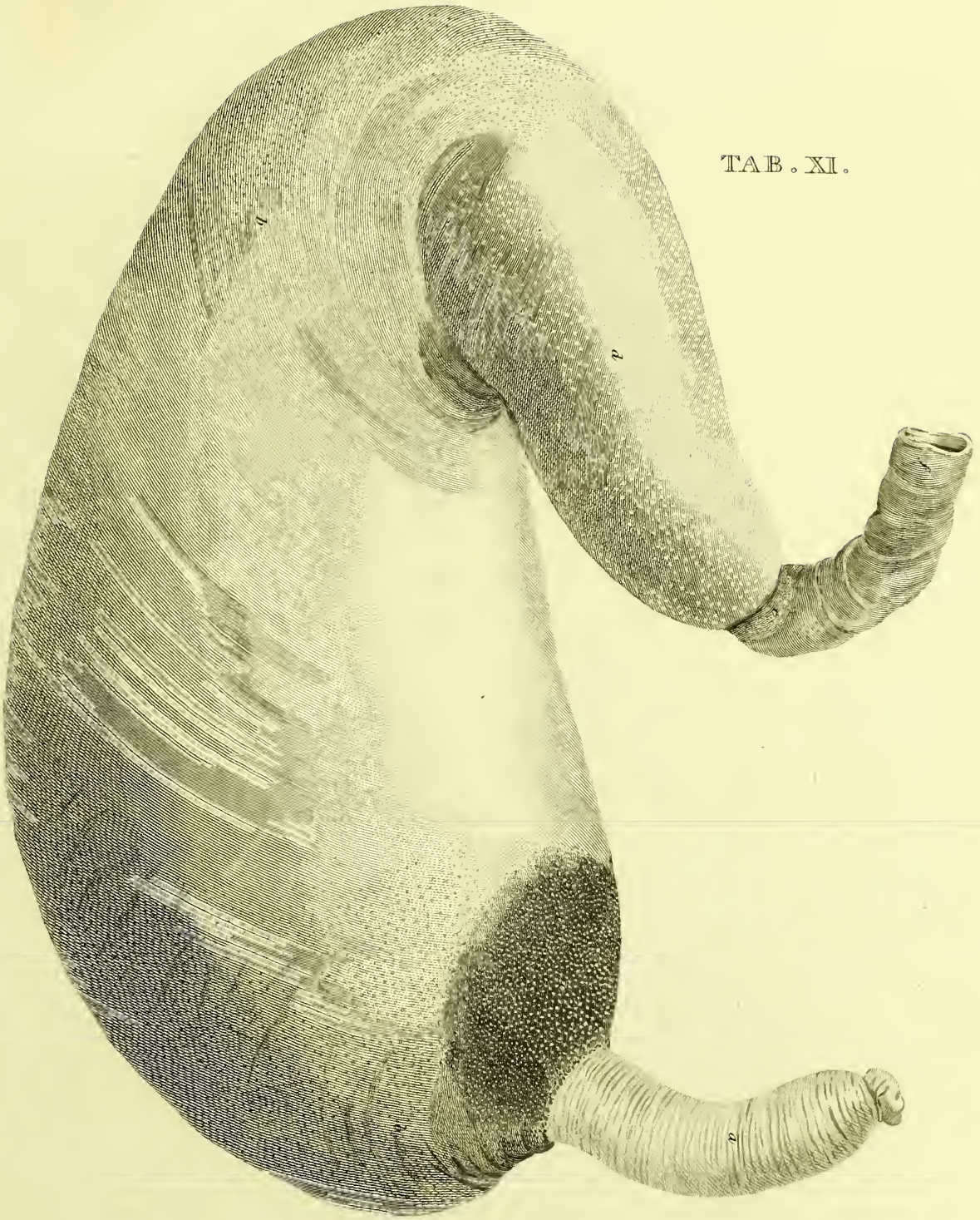
c. The gastric glands.

d. The pyloric portion.

e. The pylorus.

f. The duodenum.

TAB. XI.



TAB. XII.

The human stomach of its natural size inverted, to shew its internal surface, and the contraction which divides the cavity into two portions.

a. The œsophagus with its cuticular covering, and the orifices of the œsophageal glands, which are most conspicuous just above the termination of the cuticular lining.

b b. The cardiac portion.

c. The gastric glands.

d. The contraction dividing the cardiac from the pyloric portion.

e. The pyloric portion.

f. The pylorus.

TAB. XII.

TAB. XIII.

In this engraving are represented the stomachs of the beaver, the dor-mouse, and the water-rat, in an inverted state. Of their natural size.

The structure of the gastric glands in the beaver and dor-mouse, is unlike that met with in other quadrupeds, except the wombat; it is therefore particularly shewn.

Fig. 1. The beaver's stomach inverted, to shew its shape, and the appearance of its internal membrane.

a. The œsophagus.

b b. The cardiac portion.

c. The glandular structure peculiar to this stomach, which appears to be a cluster of gastric glands.

d. The contraction between the cardiac and pyloric portion.

e. The pyloric portion.

f. A glandular zone at the pylorus.

g. The duodenum.

Fig. 2. The orifices of the glandular structure, to shew how much they admit of being dilated, and that in that state they expose three internal openings leading into the substance of the gland.

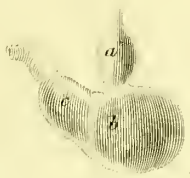
a. The œsophagus.

b b. The three ridges of glandular structure.

Fig. 3. The different processes which belong to two of the three internal openings of the gland.

Fig. 4. An external view of the stomach of the dor-mouse, to shew the situation of the glandular structure at the termi-

Fig. 4.



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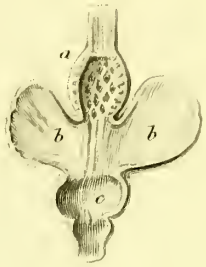

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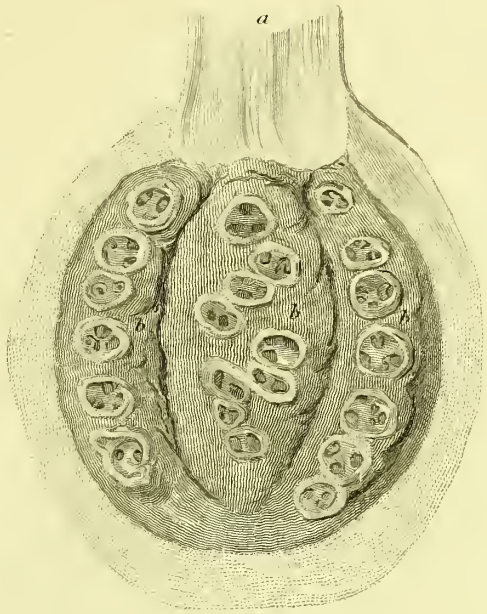

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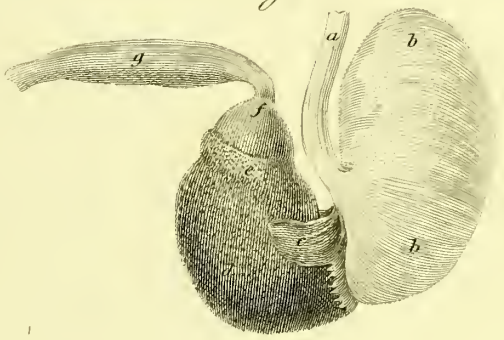
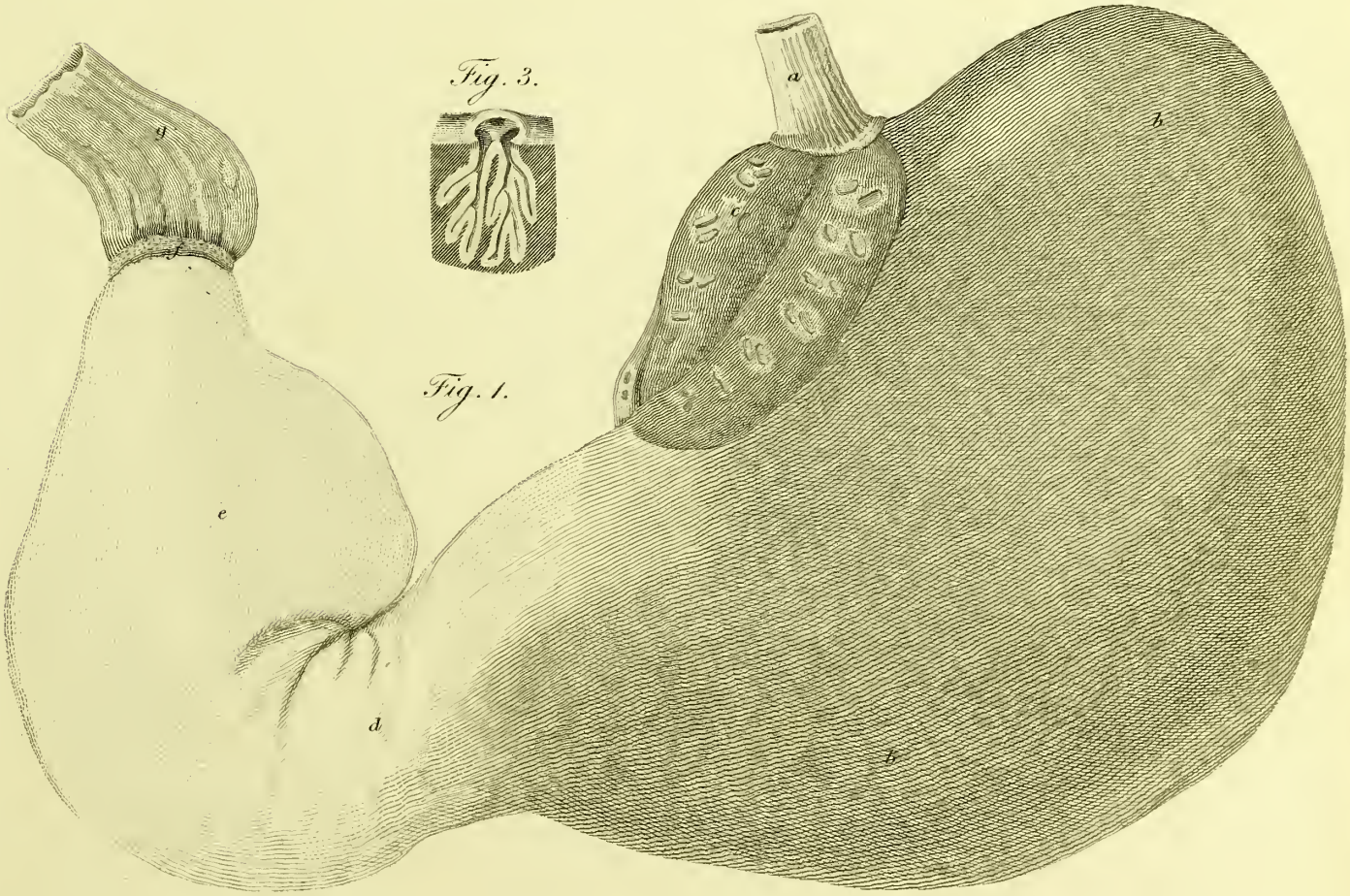


Fig. 3.

Fig. 1.



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Baxire Sc.

nation of the œsophagus ; and the cardiac and pyloric portions of the stomach.

a. The glandular structure in the œsophagus.

b. The cardiac portion of the stomach.

c. The pyloric portion.

Fig. 5. The stomach of the dor-mouse laid open to expose its internal surface.

a. The orifices in the gland corresponding to those of the beaver.

b b. The two corresponding parts of the cardiac portion of the stomach.

c. The pyloric portion.

Fig. 6. A view of the stomach of the water-rat inverted, to shew its internal structure.

a. The œsophagus.

b b. The cardiac portion covered with cuticle.

c. A process of cuticle on each side, extending into the pyloric portion.

d. A glandular structure.

e. Orifices of glands believed to secrete the gastric liquor.

f. The pylorus.

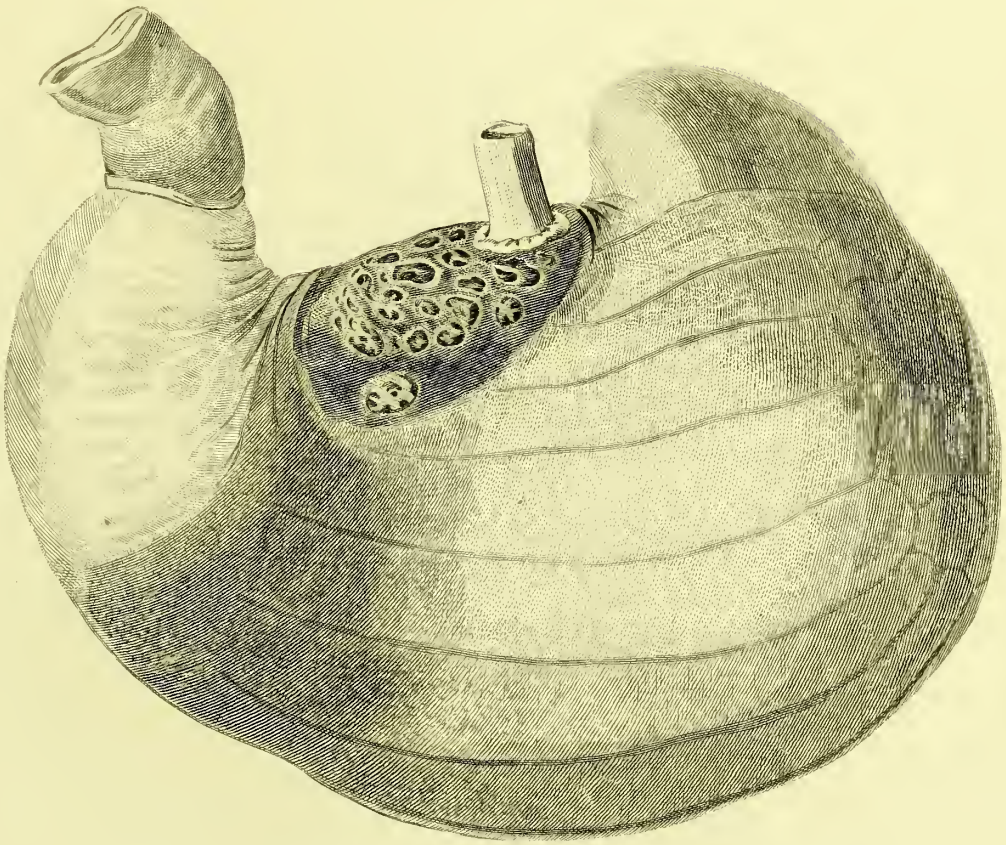
g. The duodenum.

TAB. XIV.

The stomach of the wombat inverted, immediately after death, and distended with air, so as to expose completely its internal surface, in which the glandular structure on the small curvature is exactly similar to that of the beaver.

The parts are of the natural size.

TAB. XIV.



Clift del. Basire sc.

TAB. XV.

Fig. 1. The hare's stomach inverted, to shew its natural form, and the appearance of the different parts of its internal membrane

a. The œsophagus.

b b. The cardiac portion of the stomach.

c. A muscular band separating the cardiac from the pyloric portion.

d d. The pyloric portion.

e. A glandular appearance, believed to be the gastric glands.

f. The pylorus.

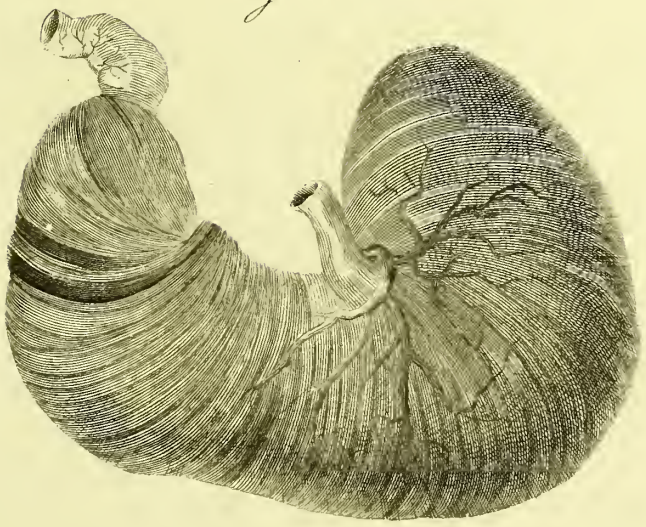
g. The duodenum.

Fig. 2. An external view of the rabbit's stomach distended with air, to shew the muscular coat. The fibres are uniformly of the same strength over the whole of the cardiac portion; but where the pyloric portion begins they are stronger, and continue to be so half way to the pylorus, at which part there is a circular band, and beyond it the fibres become spiral to the pylorus; the layers of spiral fibres decussate one another. Both figures are represented of their natural size.

TAB. XV.

Fig. 1.

Fig. 2.



TAB. XVI.

The ass's stomach inverted, to shew its internal surface. On a scale of half an inch to an inch.

a. The œsophagus.

b b. The cardiac portion of the stomach lined with cuticle, the termination of which is distinctly seen.

c. A glandular structure.

d. The orifices of the gastric glands.

e. The pylorus.

TAB. XVI.

½ Inch to an Inch.

W. Clift del.

Basire Sc.

TAB. XVII.

A view of the internal membrane of the hog's stomach, its cavity being inverted. On a state of half an inch to an inch.

a. The œsophagus.

b b. The surface of the stomach covered with cuticle.

c. The process at the cardia.

d d. The surface of the cardiac portion.

e e. A massy glandular structure between the cardiac and pyloric portions.

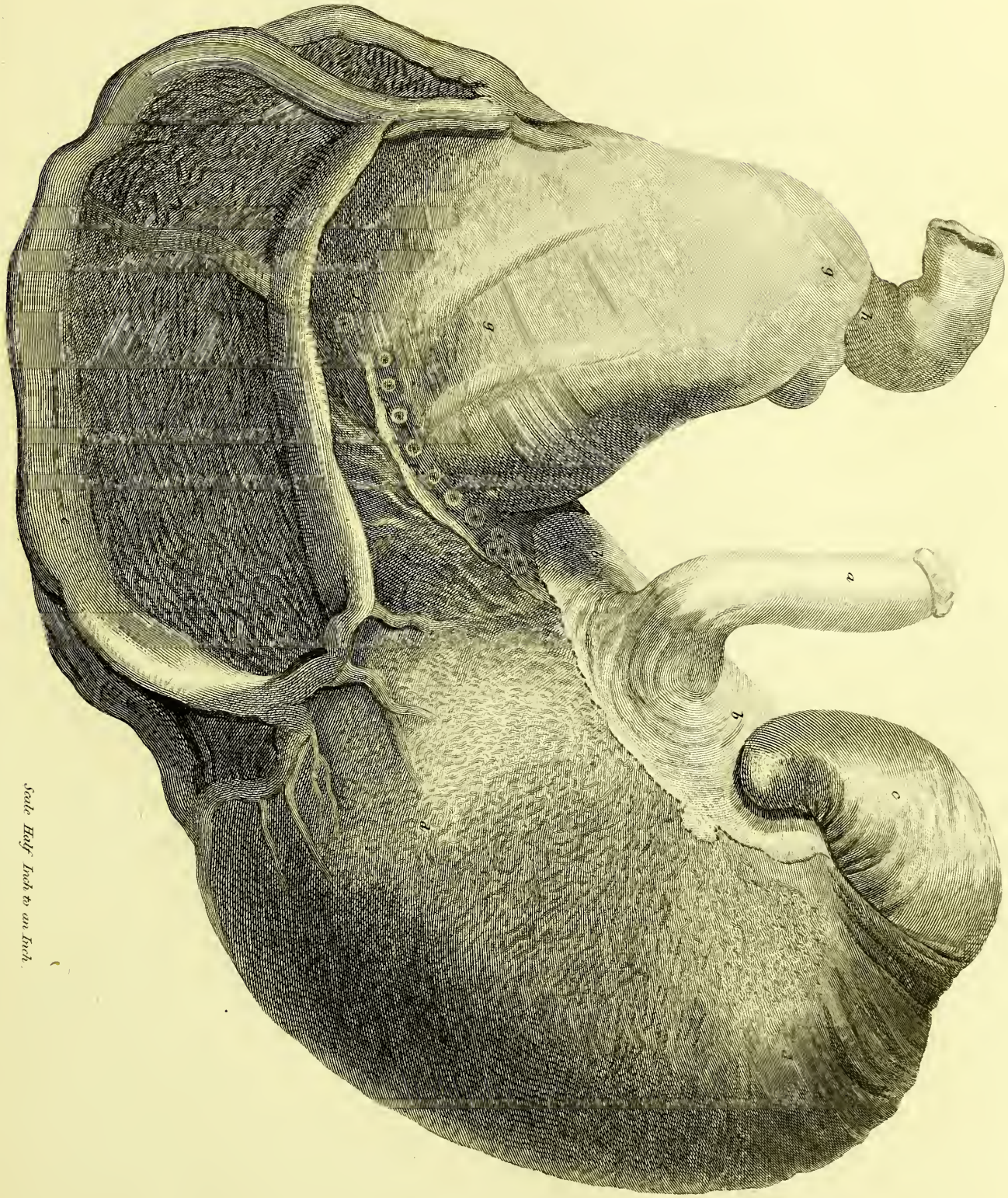
f f. The orifices of the gastric glands.

g g. The pyloric portion.

h. The pylorus.

i. The glandular projection which occasionally closes the orifice of the pylorus.

TAB. XVII.



Scale Half Inch to an Inch.

W. Clift del.

Basire Sc.

TAB. XVIII.

A section of the elephant's stomach to shew its internal surface, taken from a dried preparation, in which the blood vessels had been injected, and the cavity afterwards distended with air. On a scale of four inches to twelve.

a. The œsophagus.

b b. Fourteen transverse folds met with in the cardiac portion of the stomach: five of these are broad, and nine narrow.

c c. The cardiac portion of the stomach.

d. The pyloric portion.

e. The pylorus.

TAB. XVIII.

Scale 4 Inches to 12.

TAB. XIX.

A section of the stomach of the kanguroo, in which one-half of its cavity is exposed to view. On a scale of half an inch to an inch.

a. The œsophagus.

b. Its termination in the stomach,

c c. A portion of the inner surface of the stomach covered with cuticle.

d. A process at the cardia, in which is a glandular structure.

e e. The termination of the cuticular lining.

f f. The longitudinal band.

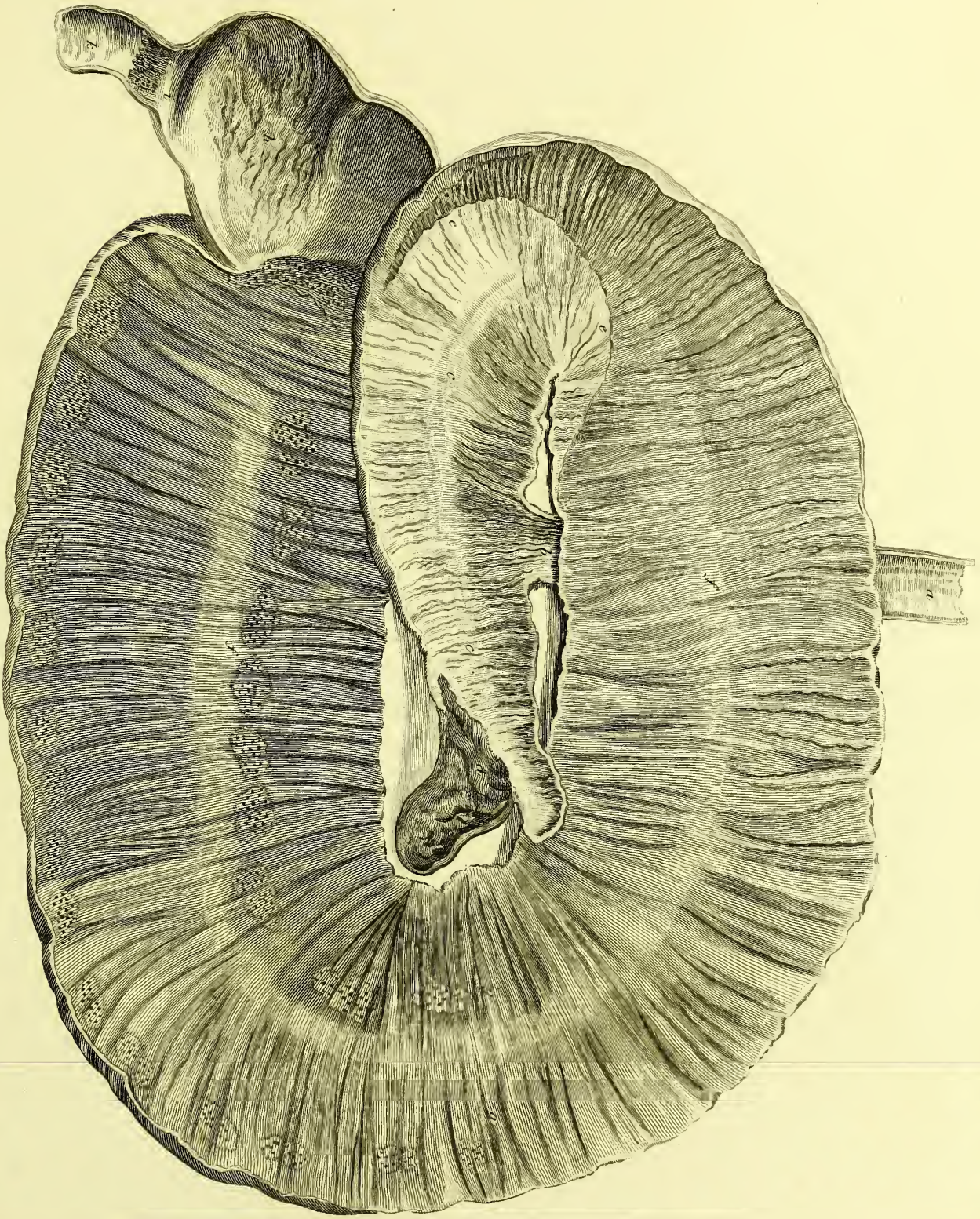
g g. Two rows of clusters of glands, which appear to secrete the gastric liquor.

h. A cavity close to the pylorus.

i. The pylorus.

k. The duodenum.

TAB. XIX.



Scale Half Inch to an Inch.

W. Clift del.

Basire Sc.

TAB. XX.

In this engraving are represented the stomachs of two species of bat, to shew the difference of the form of the cavity, and of the appearance of the internal membrane of those stomachs fitted for vegetable food, when compared with those more peculiarly adapted for digesting animal food.

Fig. 1. A longitudinal section of the vampyre-bat's stomach, to shew its internal surface.

Fig. 2. The stomach of the long-eared bat inverted, to shew its internal surface.

The parts are represented of their natural size.

TAB. XX.

Fig. 1.

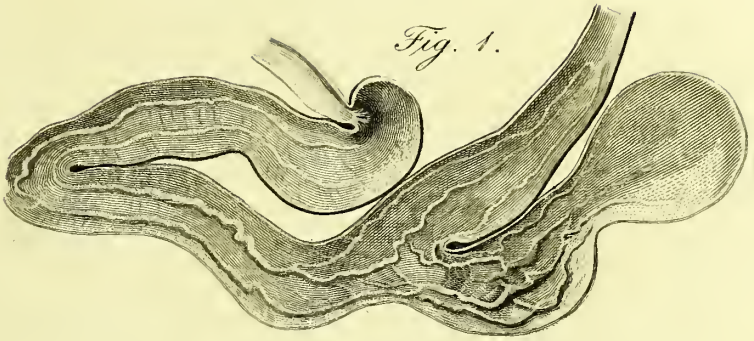


Fig. 2.

TAB. XXI.

A longitudinal section of the first cavity of the bullock's stomach, which is made up of two compartments, separated from each other by two strong transverse ridges, composed of a mixture of ligamentous and muscular fibres; also shewing the opening into the second cavity; a part of that cavity; the orifice leading into the third; and the canal through which the food is thrown up from the second cavity into the mouth, before it is conveyed into the third.

a a. The œsophagus, terminating in the first cavity of the stomach.

b b b b. The cavity itself exposed.

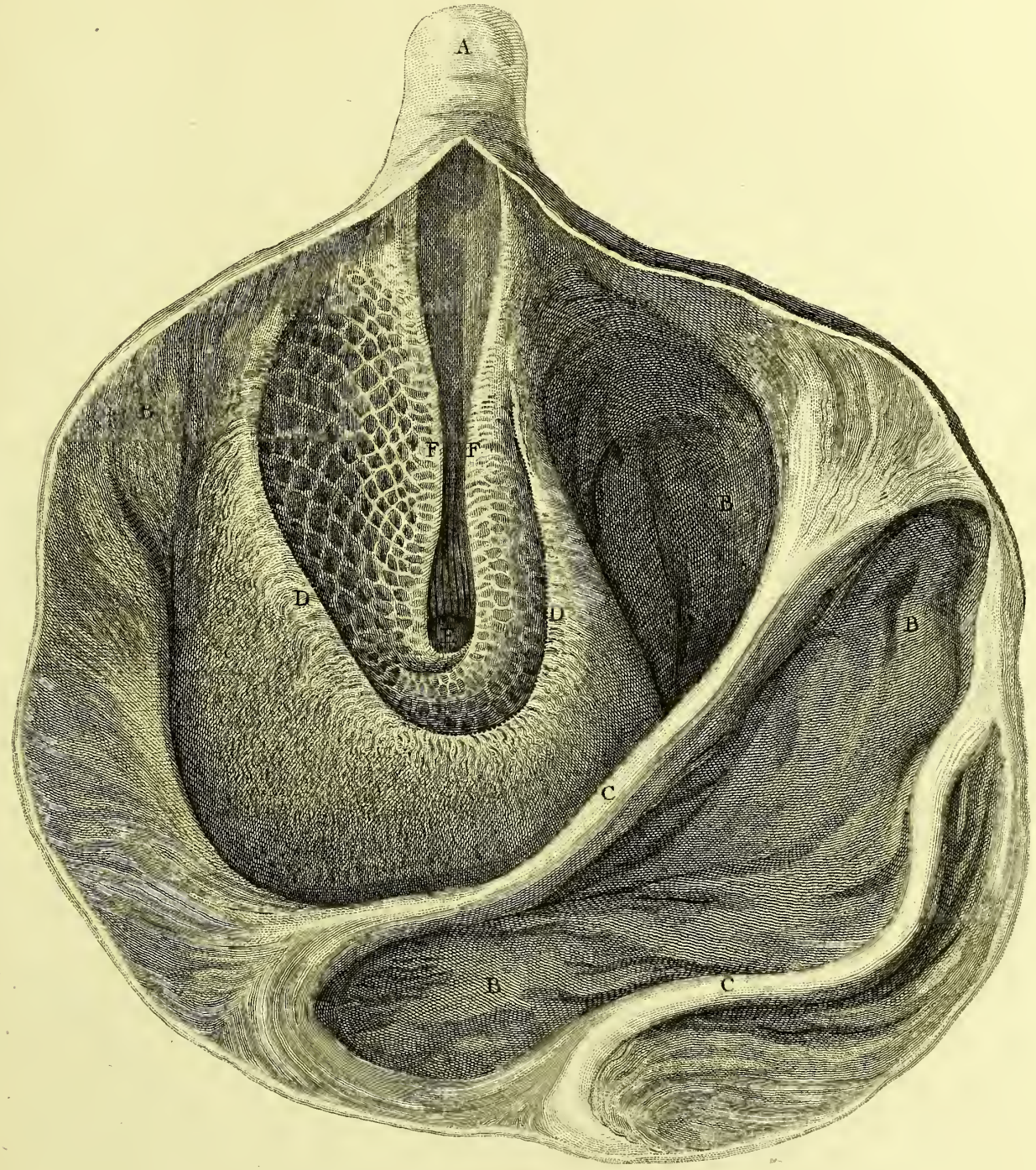
c c. The two ridges dividing it into two compartments.

d d. The orifice of the second cavity.

e. The passage leading to the third cavity.

f f. Two muscular bands which have their origin from the coats of the first cavity, and terminate in the orifice of the third, forming a canal, along which the food is conveyed from the second cavity to the mouth, and from the mouth to the third cavity. On a scale of two inches to a foot.

TAB. XXI.



Wm. Clift del.

Basire sc

TAB. XXII.

A posterior view of the first and second cavities of the stomach of the bullock unopened, and an internal view of the third and fourth in their natural relative situation to the others.

a. The œsophagus.

b b. The coats of the first cavity in a distended state.

c. The coats of the second cavity.

d. The orifice leading into the third cavity.

e e e. The plicæ of three different breadths, which are contained in the third cavity.

f. The valvular termination of the third cavity in the fourth.

g g g. The longitudinal plicæ of the fourth cavity.

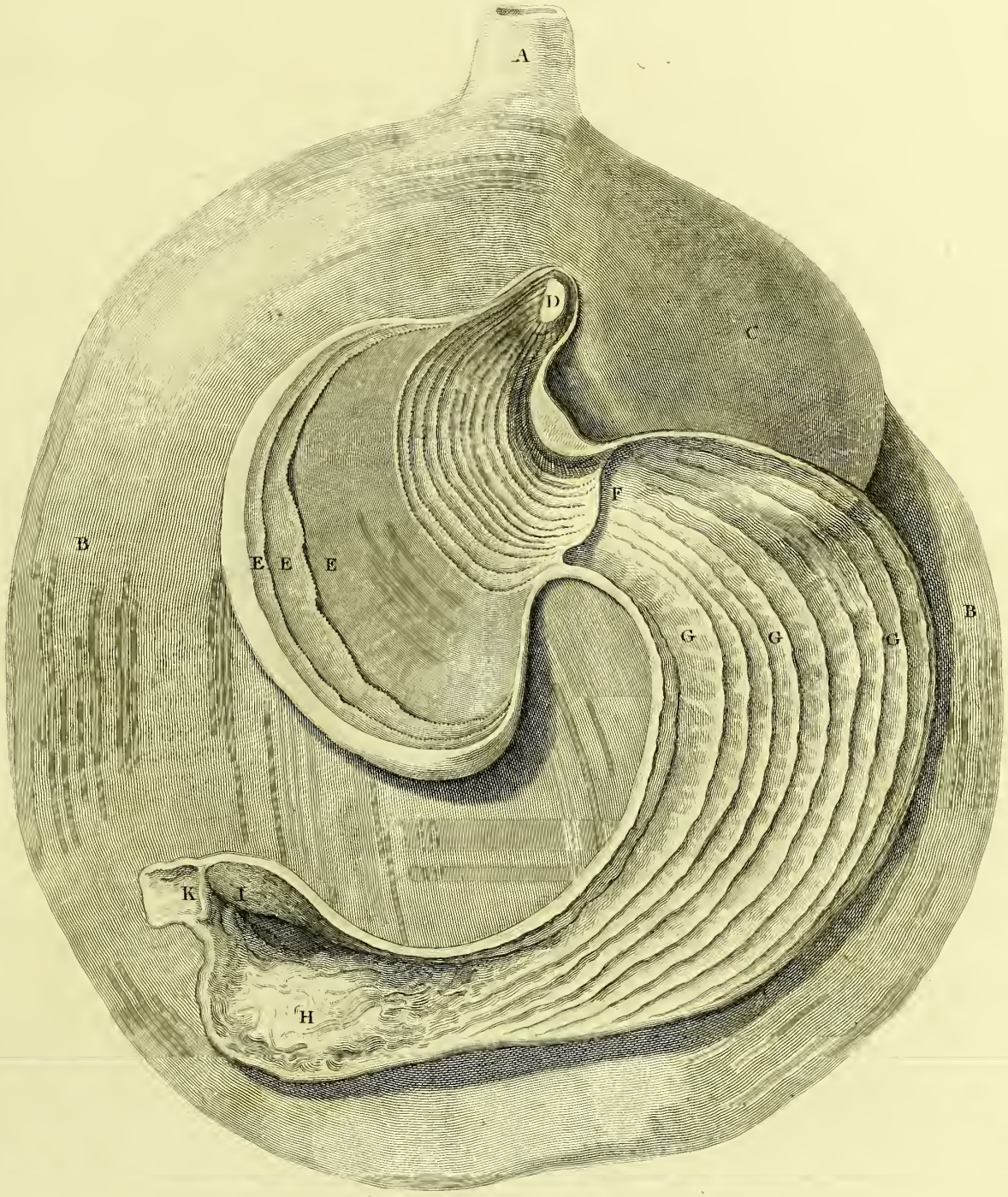
h. The rugæ of the fourth cavity near the pylorus.

i. The glandular projection opposed to the orifice of the pylorus.

k. The pylorus, or termination of the fourth cavity.

On a scale of two inches to a foot.

TAB. XXII.



Wm Clift del.

Bowe f

TAB. XXIII.

An internal view of the first cavity of the stomach of the camel, exposed in the same manner as that of the bullock in Tab. XXI. and on the same scale.

In this cavity there are two compartments, separated from each other by a longitudinal ridge, which is composed of strong muscular fibres; the orifice leading into the second cavity is distinctly seen. There is a strong muscle passing from the orifice of the first cavity, through the upper part of the second to the third, where it terminates; this muscle, and the longitudinal ridge, form the two sides of a canal, along which the ruminated food passes into the third, and on to the fourth cavity, in which digestion is carried on.

a. The œsophagus.

b b. The longitudinal ridge dividing the cavity into two compartments.

c c. The muscle which passes to the third cavity.

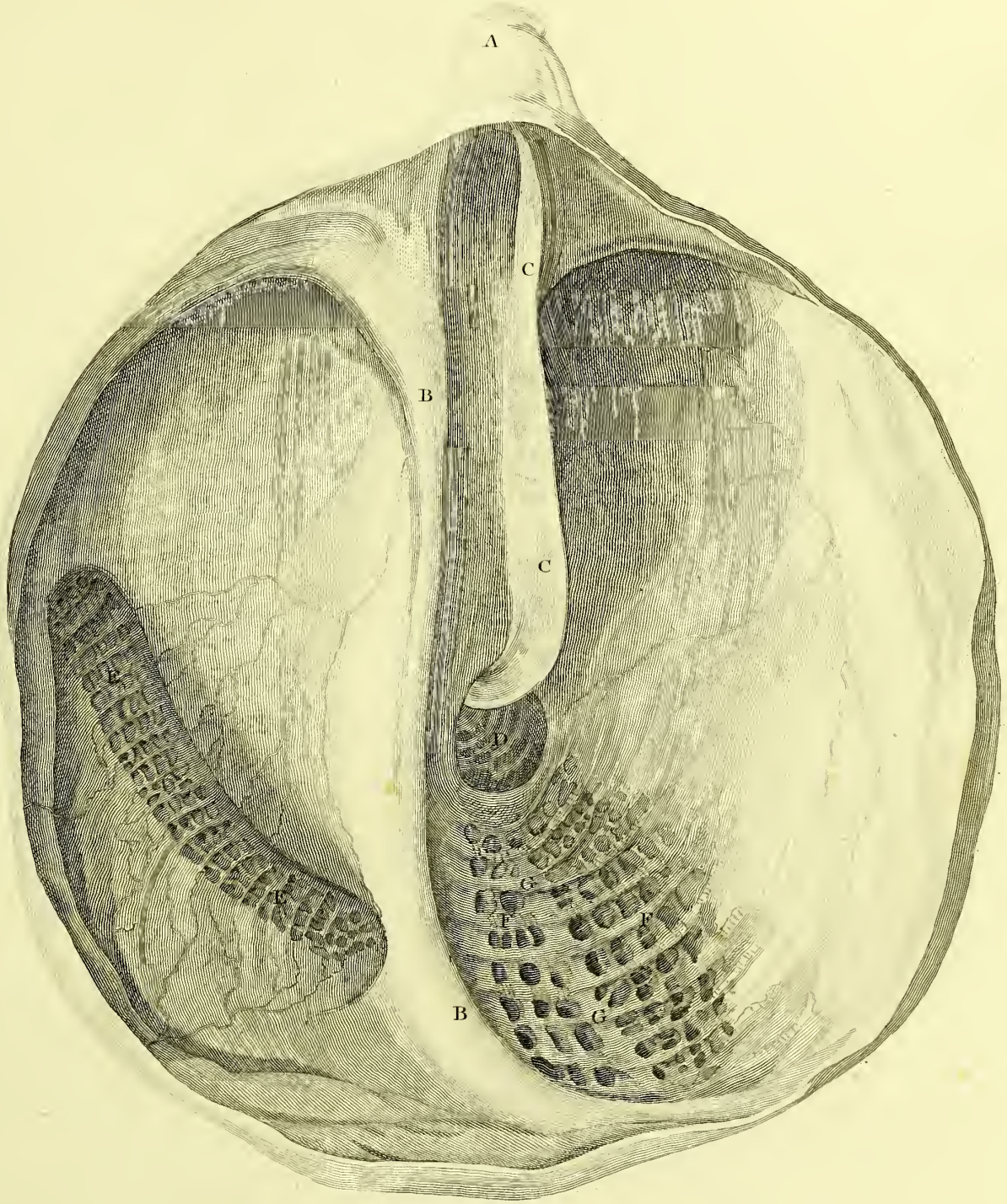
d. The opening into the second cavity.

e e. The muscular cells on the right side of the cavity.

f f. The larger cells on the left side, which contain water to moisten the food lying over them, and make it of a fit consistence to be regurgitated into the mouth, along the canal formed by the longitudinal ridge, and the muscle going to the third cavity.

g g. A broad muscular band separating the cellular structure into two portions.

TAB. XXIII.



Wm Clift del.

Basire sc.

TAB. XXIV.

A posterior view of the first cavity of the camel's stomach unopened, and an internal view of the second, third, and fourth cavities, in their relative situation to the first, similar to the view given of the stomach of the bullock in Tab. XXII. and on the same scale.

a. The œsophagus.

b b. The coats of the first cavity in a distended state.

c. The communication between the first and second cavity.

d d. The muscle running along its upper part to terminate in the orifice of the third cavity. This muscle, when it acts with its greatest force, brings forward the orifice of the third cavity nearly close to that of the second, and shuts up the cells, so that no part of the solid food can pass into them.

e e. The rows of cells which form a reservoir for the water.

f. The opening leading into the third cavity of the stomach.

g. The third cavity.

h. The orifice of the fourth cavity.

i i. The longitudinal plicæ of the fourth cavity.

k k. The rugous structure of the lower part of the fourth cavity.

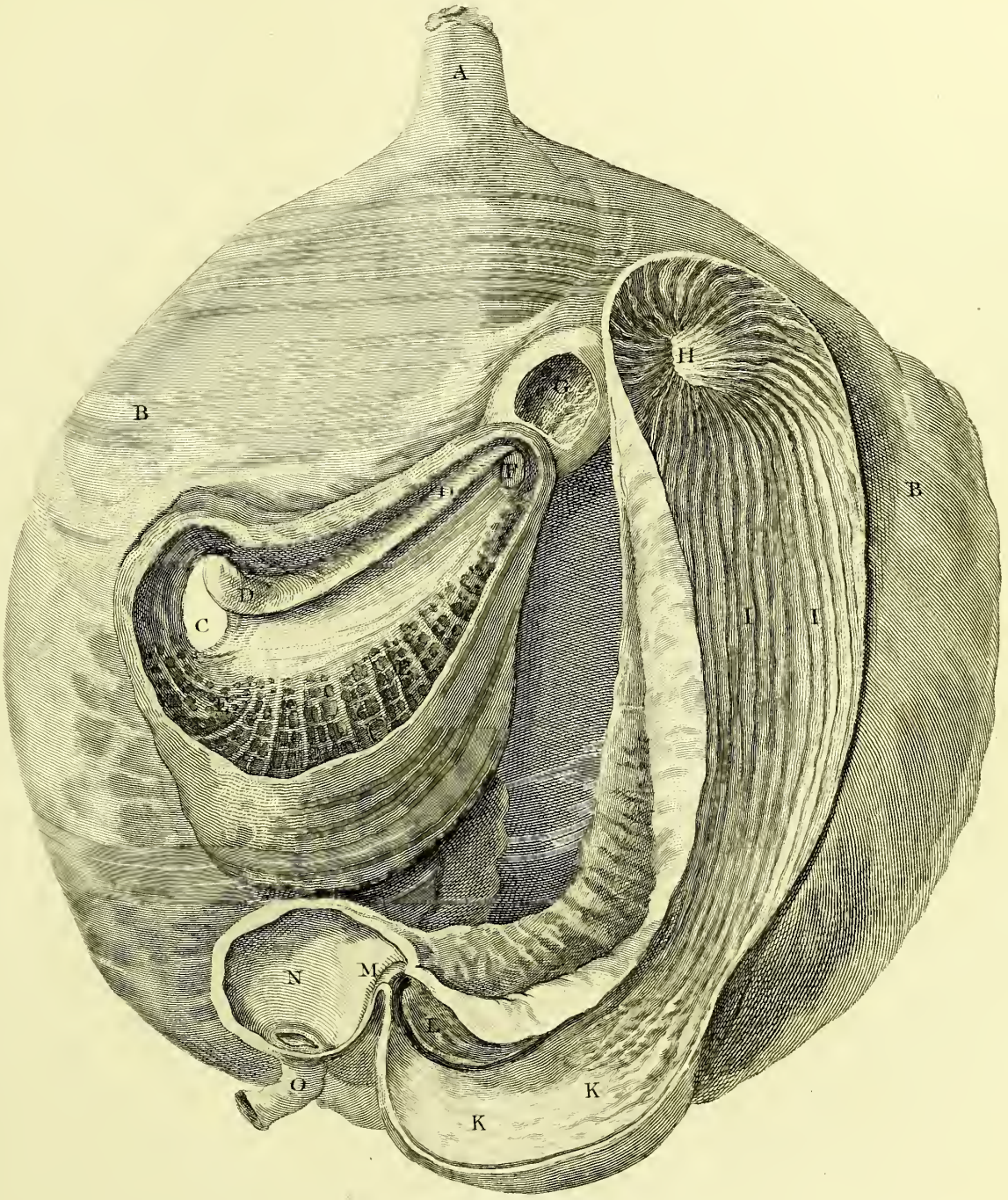
l. The glandular projection opposed to the orifice of the pylorus.

m. The pylorus.

n. A dilatation or membranous cavity between the pylorus and duodenum.

o. The duodenum.

TAB. XXIV.



Wm Clift del.

Basire sc

TAB. XXV.

The muscular structure by means of which the orifices of the cells in the camel's stomach are closed, to prevent the solid food from falling into them. Six of the cells in the lower part of the left side of the first cavity of the stomach are exposed, with a portion of the longitudinal ridge by which they are bounded. These particular cells were chosen in preference to those of the second cavity, as they are the largest, and the muscular fibres are most distinctly seen. The same structure is met with in the cells of the second cavity.

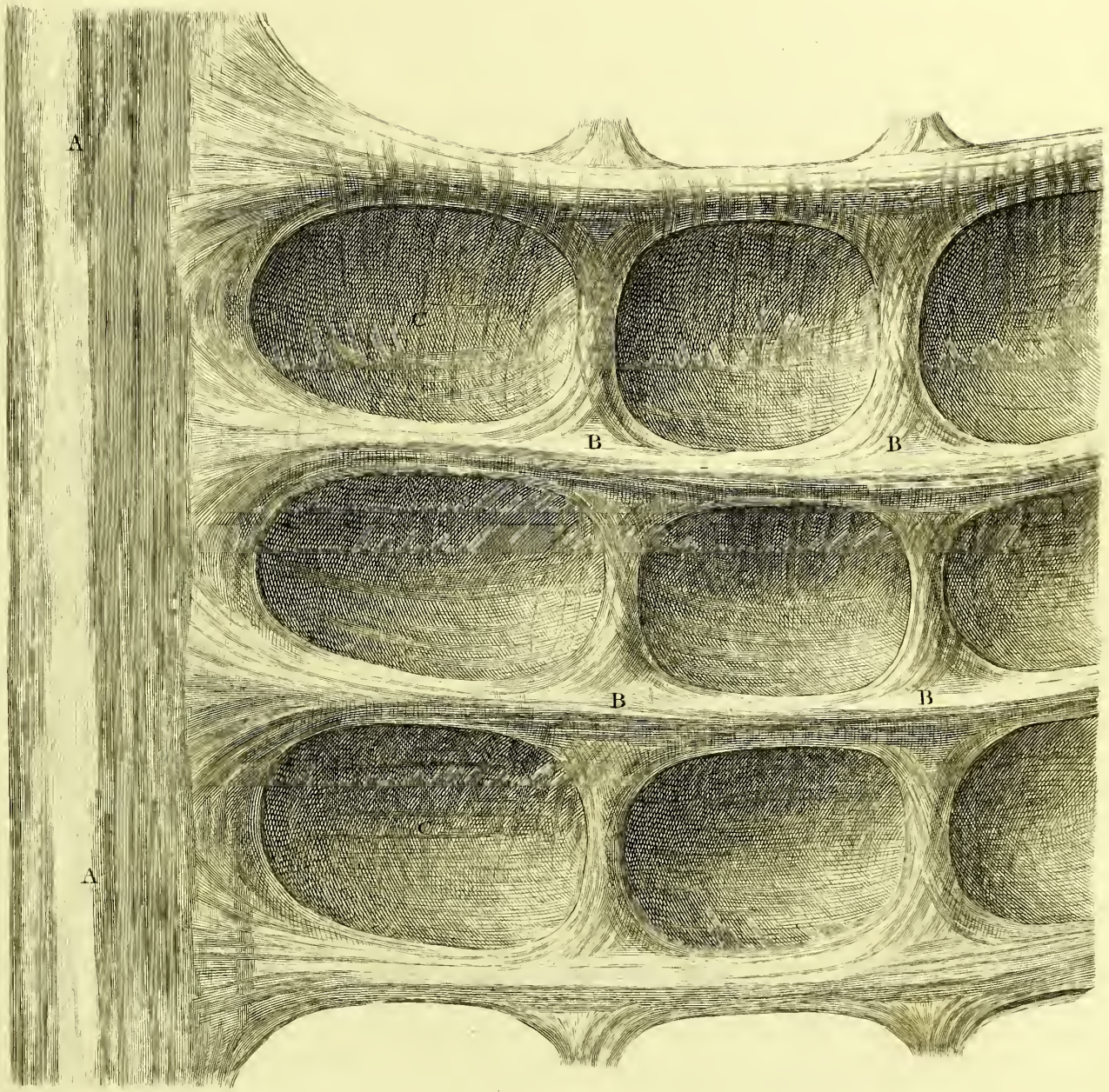
a a. The longitudinal ridge, to shew its muscular structure, and the mode in which the fibres go off from it to furnish those that pass round the orifices of the cells.

b b b b. The course of the fibres going from cell to cell.

c c. The muscular fibres by which the cells are enabled to throw out their contents.

The parts are represented of their natural size.

TAB. XXV.



Wm Clift del.

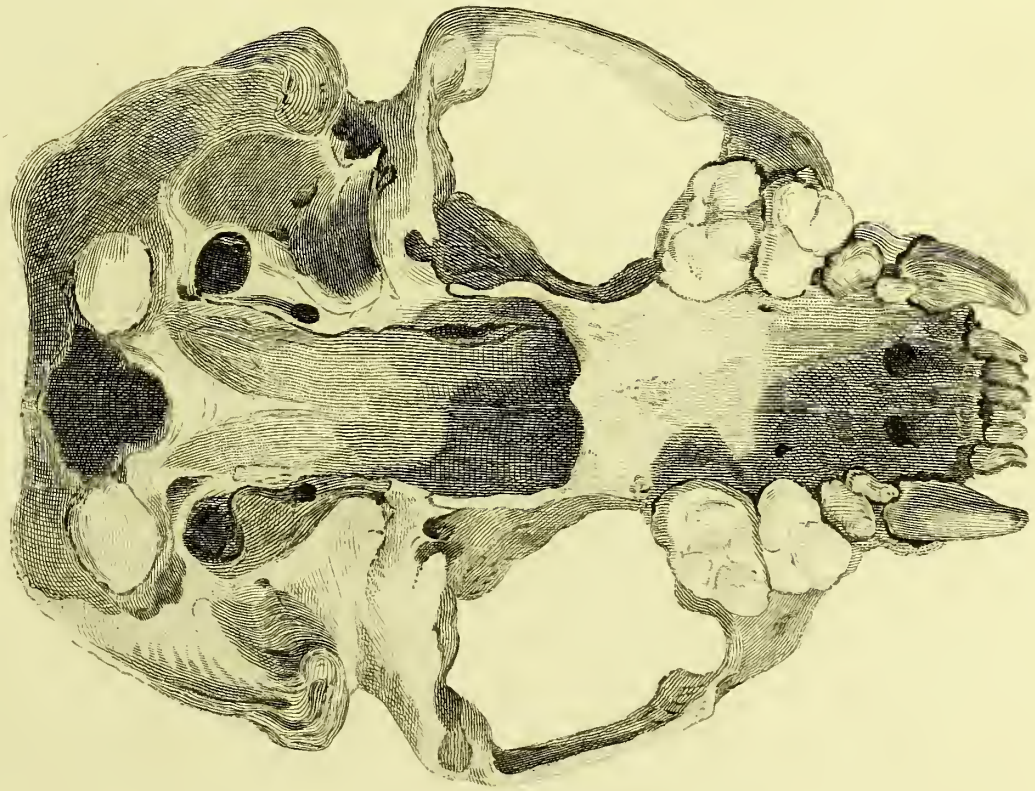
Basire sc.

TAB. XXVI.

The basis of the skull and lower jaw of the sea otter, separated from each other to shew the number and appearance of the teeth, the peculiar shape of the condyles of the lower jaw, and of the oblong cavities in the basis of the skull with which they are articulated.

Nearly of the natural size.

TAB. XXVI.



TAB. XXVII.

Three figures of the lower jaw of the wild boar, in different stages of growth, to shew the succession of the teeth. The figures are on a scale of half an inch to an inch.

Fig. 1. Represents the first set of grinders and the mode in which they are shed, by others rising up immediately under them: one of the second set is in its place; another is forming in the substance of the jaw; and there is a small cell behind it, in which were the rudiments of the succeeding tooth.

Fig. 2. The second set of teeth in their place, with the small cell delineated in the first figure, increased to a large size, and containing an imperfectly-formed tooth, greatly exceeding in size any of the others.

Fig. 3. The jaw in a still more advanced stage of its growth, with the tooth which was only forming in the second figure, now come to its full size, and in its proper place in the row of teeth: there is also a new cell formed for a succeeding tooth.

TAB. XXVII.

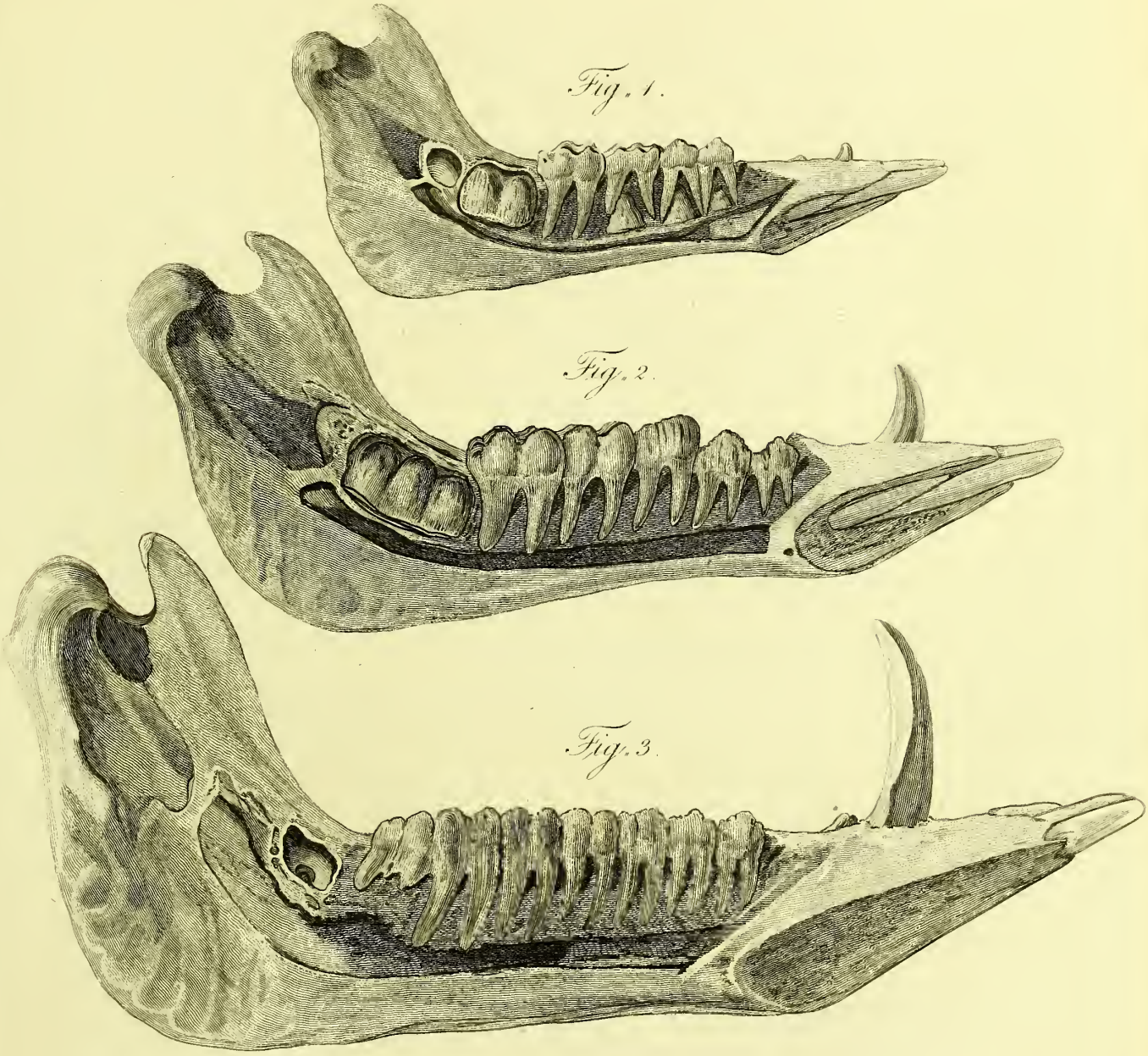


Fig. 1.

Fig. 2.

Fig. 3.

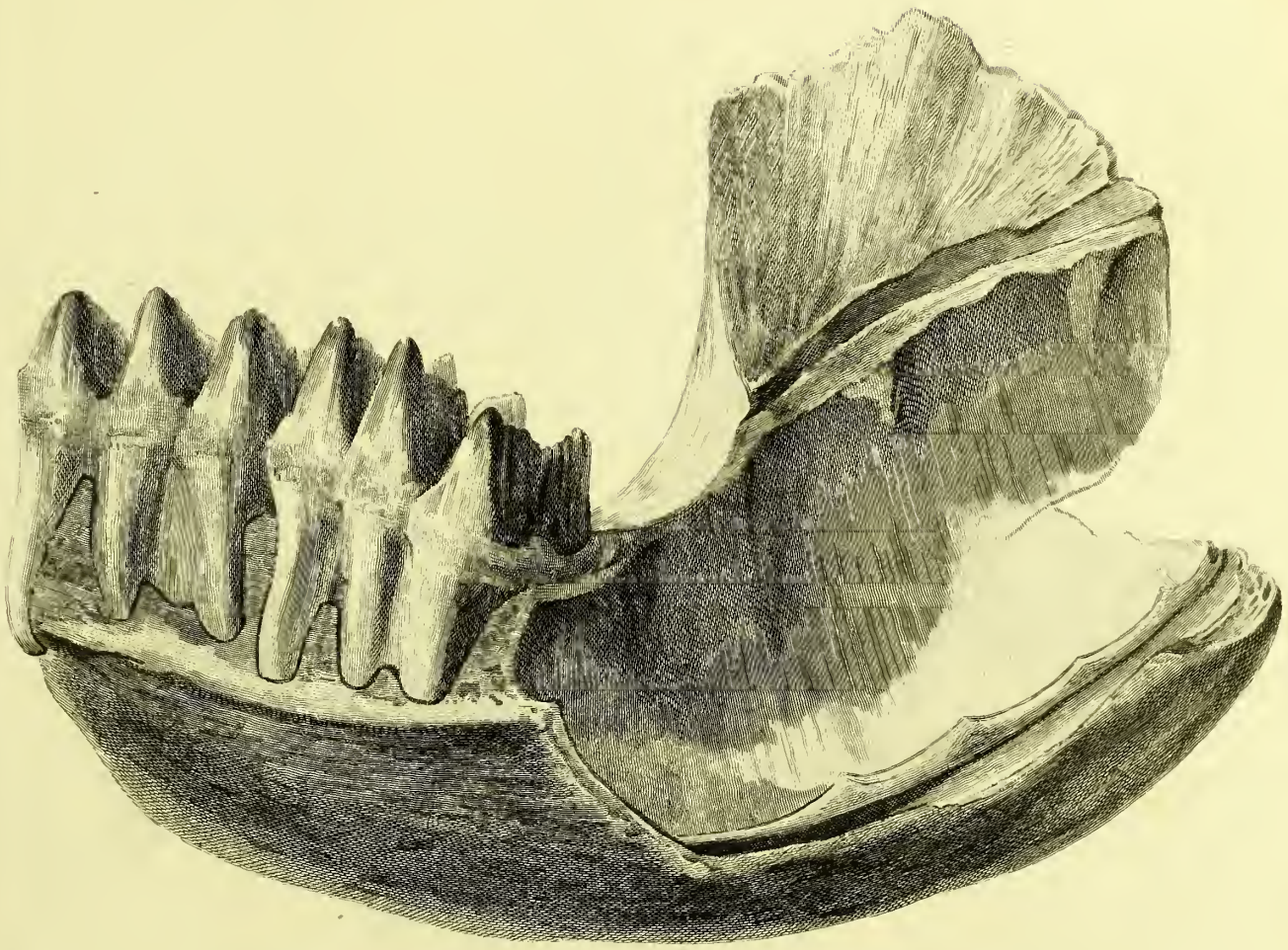
Wm Clift del.

J.t Bauire sc

TAB. XXVIII.

A portion of the lower jaw of the animal incognitum, (on a scale of half an inch to an inch,) to shew the appearance of the smaller or first-formed grinders in their place in the jaw; also the cavity immediately behind them in the substance of the jaw, in which were contained the rudiments of the larger grinder, which is afterwards to come forward.

TAB. XXVIII.



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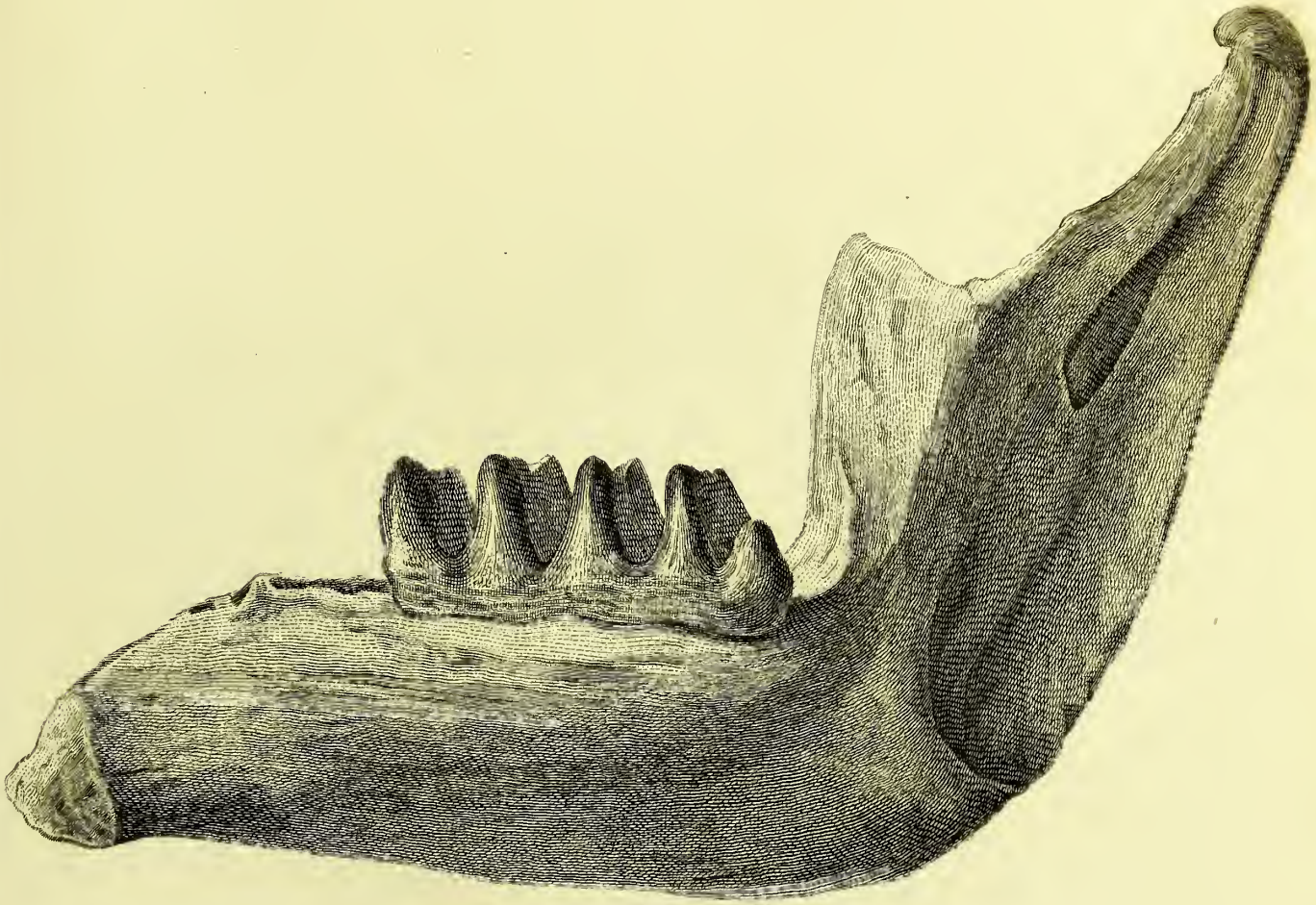
J. Basire sc

TAB. XXIX.

The lower jaw of the animal incognitum, with the large grinder in its proper place, and imperfect remains of the socket of the smaller grinder. On a scale of one-third of an inch to an inch.

TAB. XXIX.



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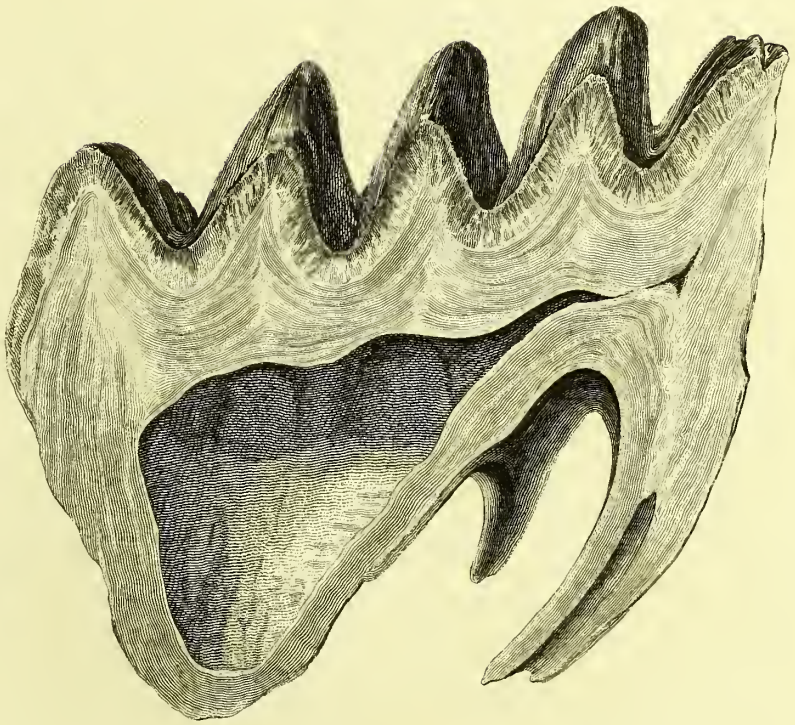
J. Basire sc.

TAB. XXX.

A section of a grinding tooth of the animal incognitum, on a scale of half an inch to an inch, to shew the internal structure, and the mode in which the tooth is formed upon the pulp. From this section, it is evident that this tooth does not arrive at perfection in all its parts at the same time: one portion of the tooth is first completed, and afterwards the other parts in succession. The part which is nearly solid was the first formed; and the pulp, upon which the rest of the body of the tooth was to have become solid, was contained in the cavity not yet filled up.

TAB. XXX.



Wm Clift del.

TAB. XXXI.

The grinding teeth of the horse, cow, sheep, and hippopotamus, represented of their natural size.

Fig. 1. A transverse section of the horse's grinding tooth polished, to shew the relative situation of the three different structures, ivory, bone, and enamel, of which it is composed: these are distinguished in the following manner; the ivory is delineated by waving lines; the enamel by short transverse ones; and the bone, by being left blank. Two portions of the bony structure are enclosed by enamel, and a third is on the outside of the enamel altogether.

The two holes were probably to give passage to arteries, and were enlarged by the food falling into them and wearing away their sides.

Fig. 2. A similar section of a grinding tooth of the cow. The shape of the bony portions inclosed by the enamel is different; and there is a smaller portion of bone on the outside of the tooth.

Fig. 3. A similar section of a grinding tooth of the sheep. The portions of bone inclosed by the enamel are very small, and there is none on the outer side of the tooth.

Fig. 4, 5, and 6. Three sections of a grinding tooth of the hippopotamus, to shew that there are portions of enamel intermixed with the ivory, of which the tooth is composed, but no bone whatever.

Fig. 4. A transverse section polished.

Fig. 5. A view of the upper surface of a shedding tooth, to shew the uncommon appearance of its surface before it is worn by use.

Fig. 6. A longitudinal section of a full-grown tooth, to shew the plate of enamel passing down the centre, as the section is oblique: the enamel passes lower down on one side than on the other.

TAB. XXXI.

Fig. 1.

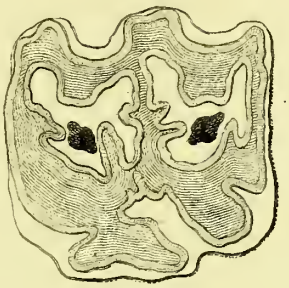


Fig. 2.

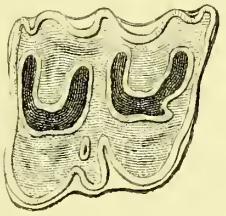


Fig. 3.

Fig. 4.

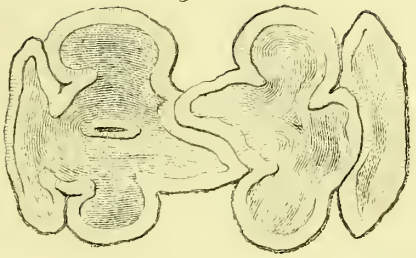
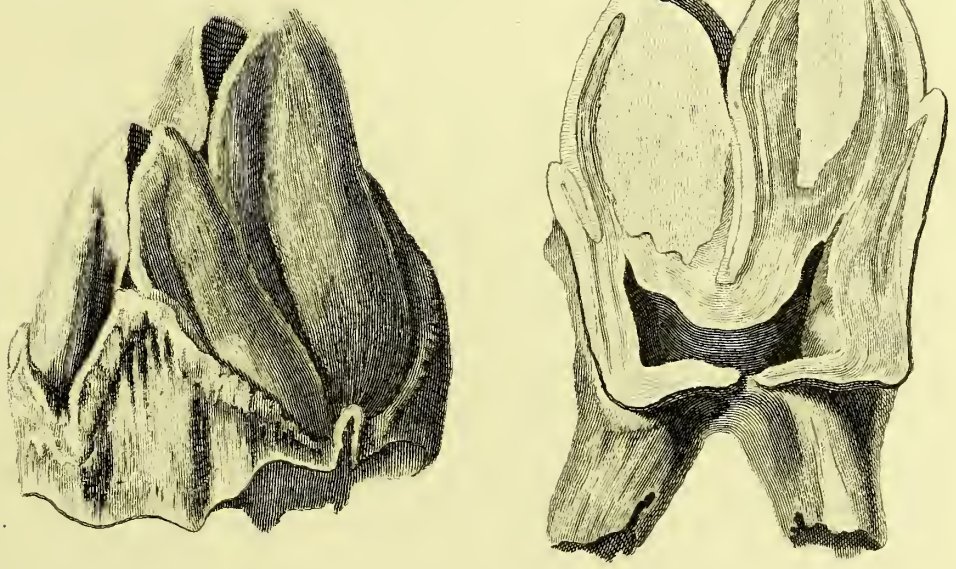


Fig. 6.

Fig. 5.



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TAB. XXXII.

Three views of a grinding tooth of the rhinoceros, to shew its shape and internal structure. Of the natural size.

Fig. 1. A view of the grinding surface taken obliquely from the side of the tooth next the mouth, to shew the middle space, which is hollow, between the two projecting walls of the tooth.

Fig. 2. A front view, shewing its shape and the number of its fangs.

Fig. 3. A transverse section, polished, to shew the peculiar shape of the middle space, and the mode in which the enamel every where surrounds the substance of the tooth.

TAB. XXXII.

Fig. 1.

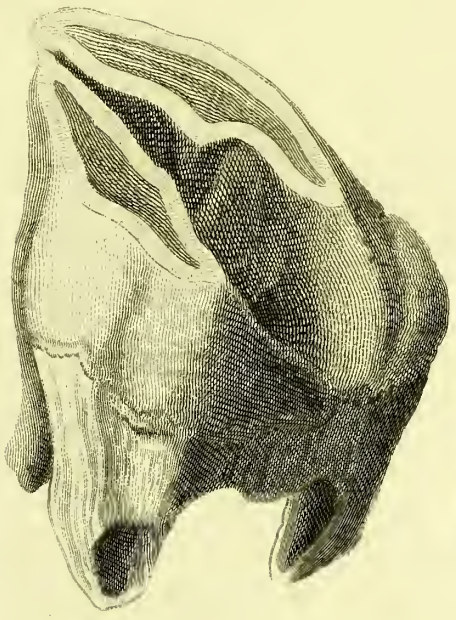


Fig. 2.

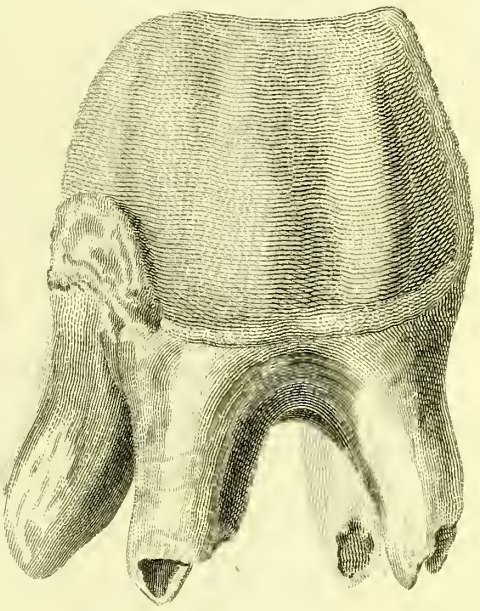
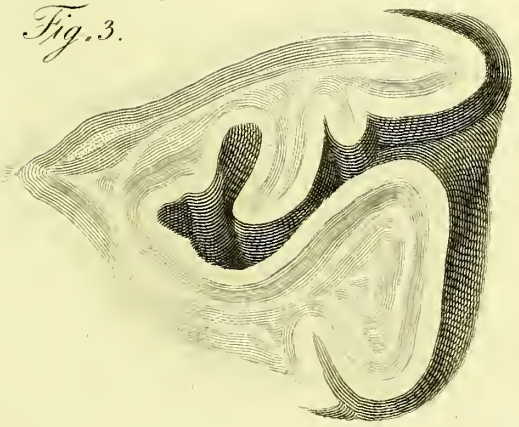


Fig. 3.



W. Clift del.

TAB. XXXIII.

A longitudinal section of a grinding tooth of the Asiatic elephant in a growing state. The tooth had been previously steeped in the muriatic acid to render it soft, that it might be divided with less injury to the tender parts.

The different plates which compose the tooth are distinctly seen, but the enamel which surrounded them was dissolved in the acid; so that there is a vacant space between them and the bony substance in which they appear to be imbedded. The bony substance, which is completely formed along the upper part of the tooth, is hard and compact; but the projecting portions, near their termination, are not ossified, but in the state of a membrane.

The cavity of the body of the tooth is filled with a vascular pulp, portions of which pass up into the different spaces for their formation: these are conical in their shape; so that the plates of the tooth formed upon them, as they become longer, have their sides separated more and more, till at last the lower edge comes in contact with, and unites to that of the neighbouring plates, connecting them together, and forming the cavity of the tooth, to which the fangs are afterwards added.

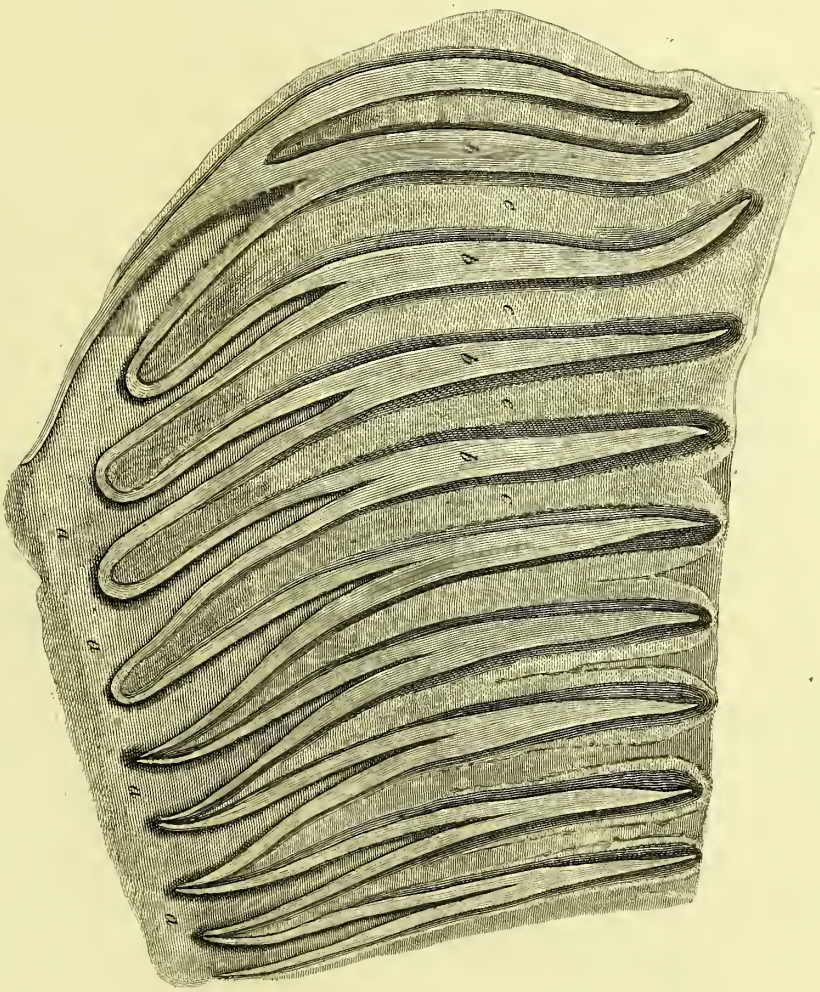
a a a a. The pulp and its processes.

b b b b. The plates formed upon the processes of pulp.

c c c c. The intermediate bony substance between the plates.

The parts are represented of the natural size.

TAB. XXXIII.



W. Clift del.

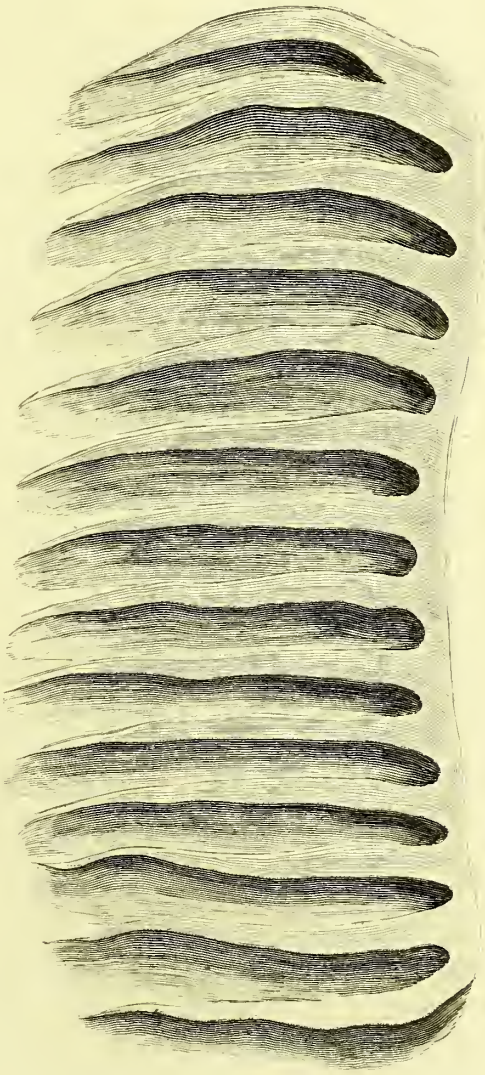
Basire sc.

TAB. XXXIV.

The substance in which the bony part of the elephant's grinding tooth is afterwards to be deposited; it is of a consistence between ligament and membrane. The thinner portions resemble the membranes in which the flat bones of animals are formed.

The parts are of the natural size.

TAB. XXXIV.



TAB. XXXV.

A longitudinal section of the Asiatic elephant's tooth highly polished, to shew more perfectly the component parts. The different degrees of hardness are distinguished by the polish they bear, as well as the arrangements of the parts which form them. In the enamel, the texture is fibrous, and the direction of the fibres is transverse. In the plates, the texture is laminated, and the direction of the laminæ is longitudinal. In the bony part, there are no distinct fibres nor laminæ.

In this tooth a small portion only is completely formed, the rest being still in a growing state. The fangs are not yet added; there is, however, the origin of one of them.

The parts are of the natural size.

TAB. XXXV.

W. Clift del.

Basire sc.

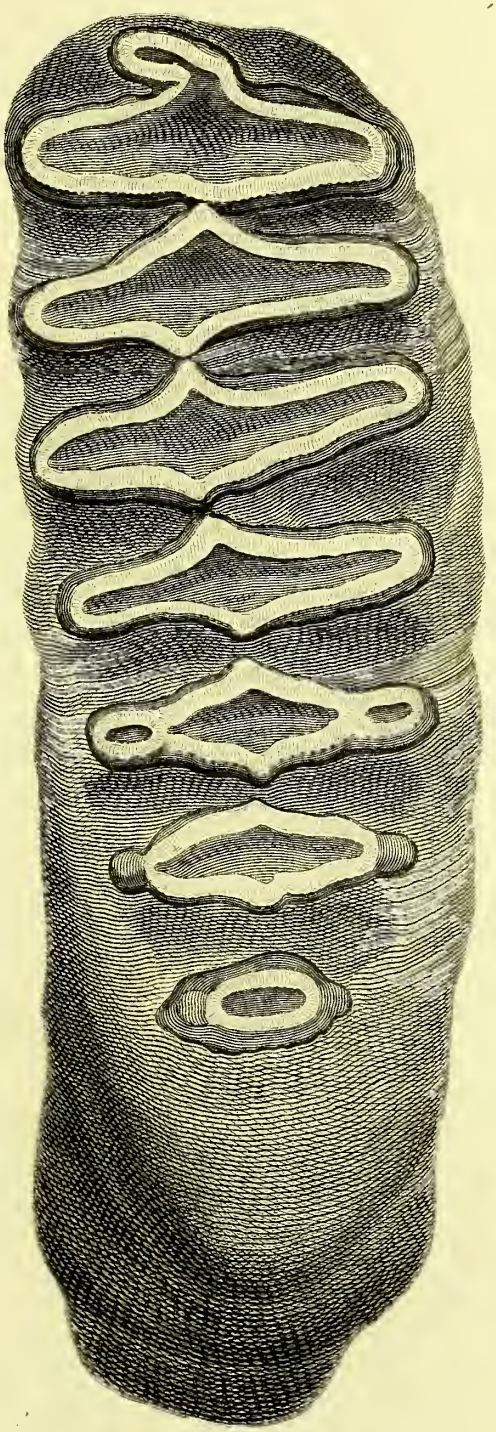
TAB. XXXVI.

The grinding surface of the African elephant's tooth, to shew that the plates of which it is made up, are of a different shape from those of the Asiatic elephant.

To see the true shape of each plate, it is necessary that the points should be worn down to some depth, which in the present specimen is only the case with the four largest; the other three shew the different thicknesses of the plates nearer their termination, on the upper surface of the tooth.

The parts are of the natural size.

TAB. XXXVI.



TAB. XXXVII.

A longitudinal section of a portion of the African elephant's grinding tooth, highly polished, to shew the relative situation of the ivory, the enamel, and the bone. The cavity of the tooth and of the fang is exposed.

The parts are of the natural size.

TAB. XXXVII.

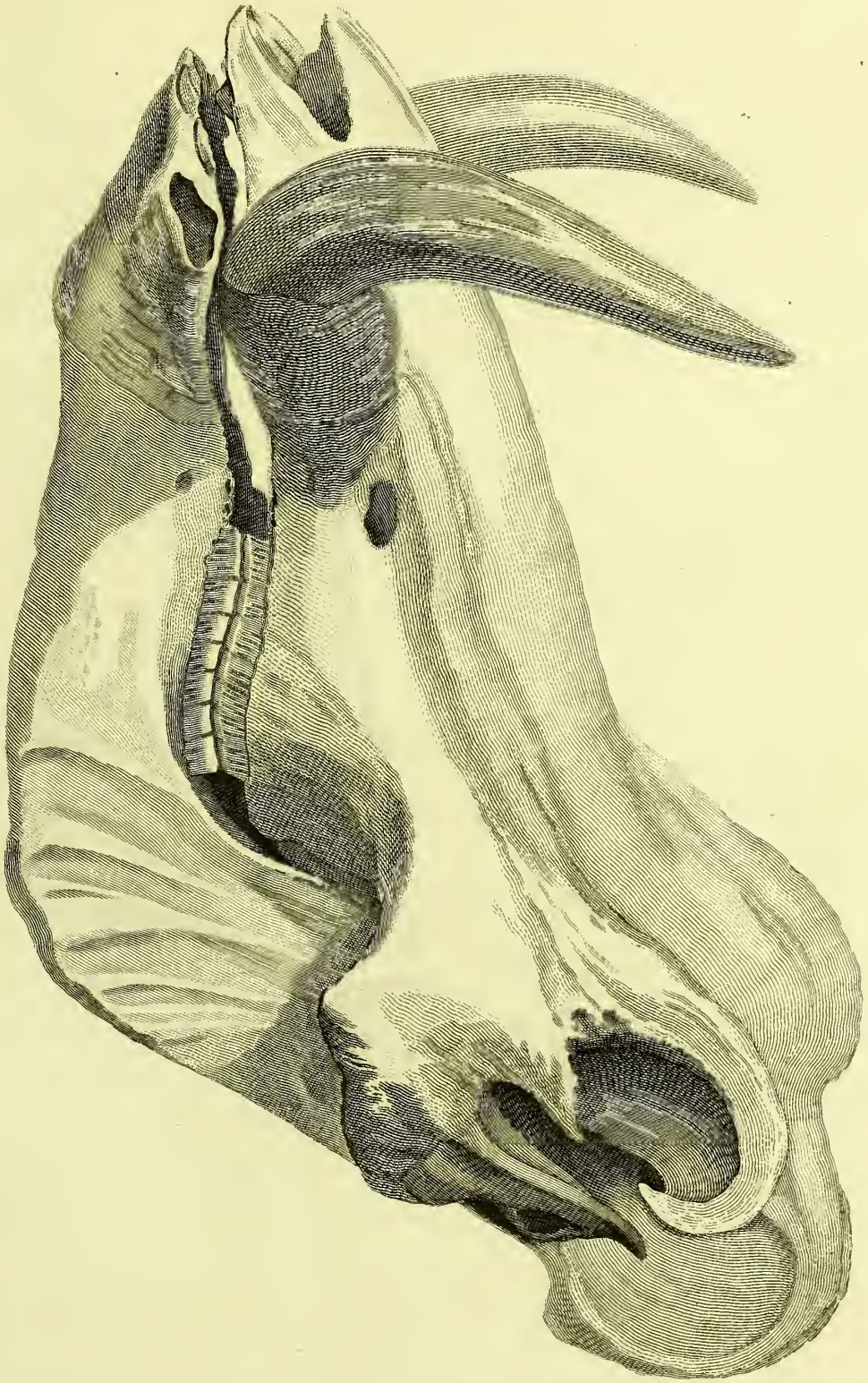
W. Clift del.

Hagbe Sc.

TAB. XXXVIII.

A side view of the skull of the *Sus Æthiopicus*, (on a scale of half an inch to an inch), to shew the situation and appearance of the large grinding tooth, and the remains of the alveoli belonging to the fangs of the preceding one. The edges of this grinding tooth are notched, so as to put on the appearance of several distinct teeth, in contact with each other.

TAB. XXXVIII.



W. Clift del.

Basire fc.

TAB. XXXIX.

Fig. 1. A side view of the skull of a young *Sus Æthiopicus*, to shew the mode in which the grinding teeth are pushed forward, as the large one increases in size. On a scale of half an inch to an inch.

Fig. 2. A side view of the full-grown grinding tooth, of the natural size.

Fig. 3. A transverse section polished, to shew the mixture of bone with the enamel and ivory of the tooth, of the natural size.

TAB. XXXIX.

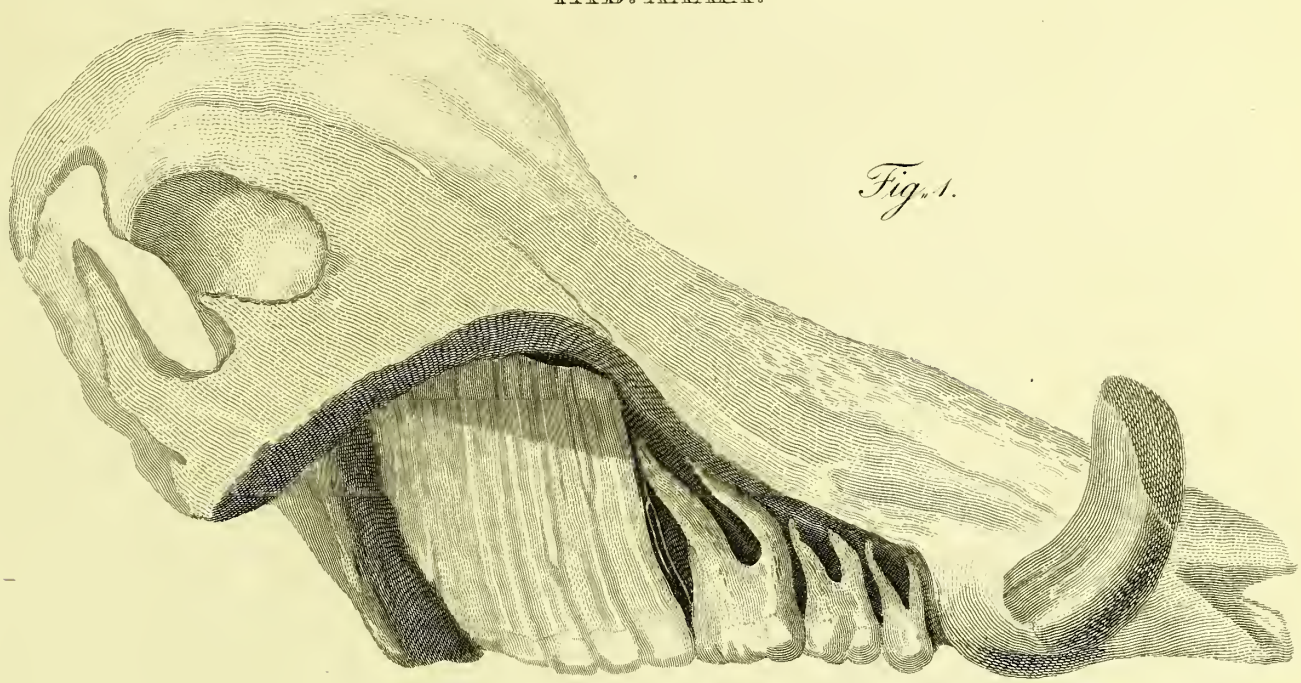


Fig. 1.

Fig. 2.

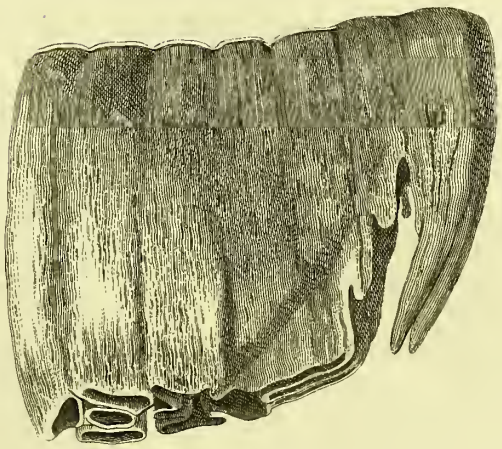
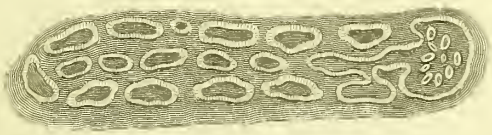


Fig. 3.



W. Clift del.

Bagster sc.

TAB. XL.

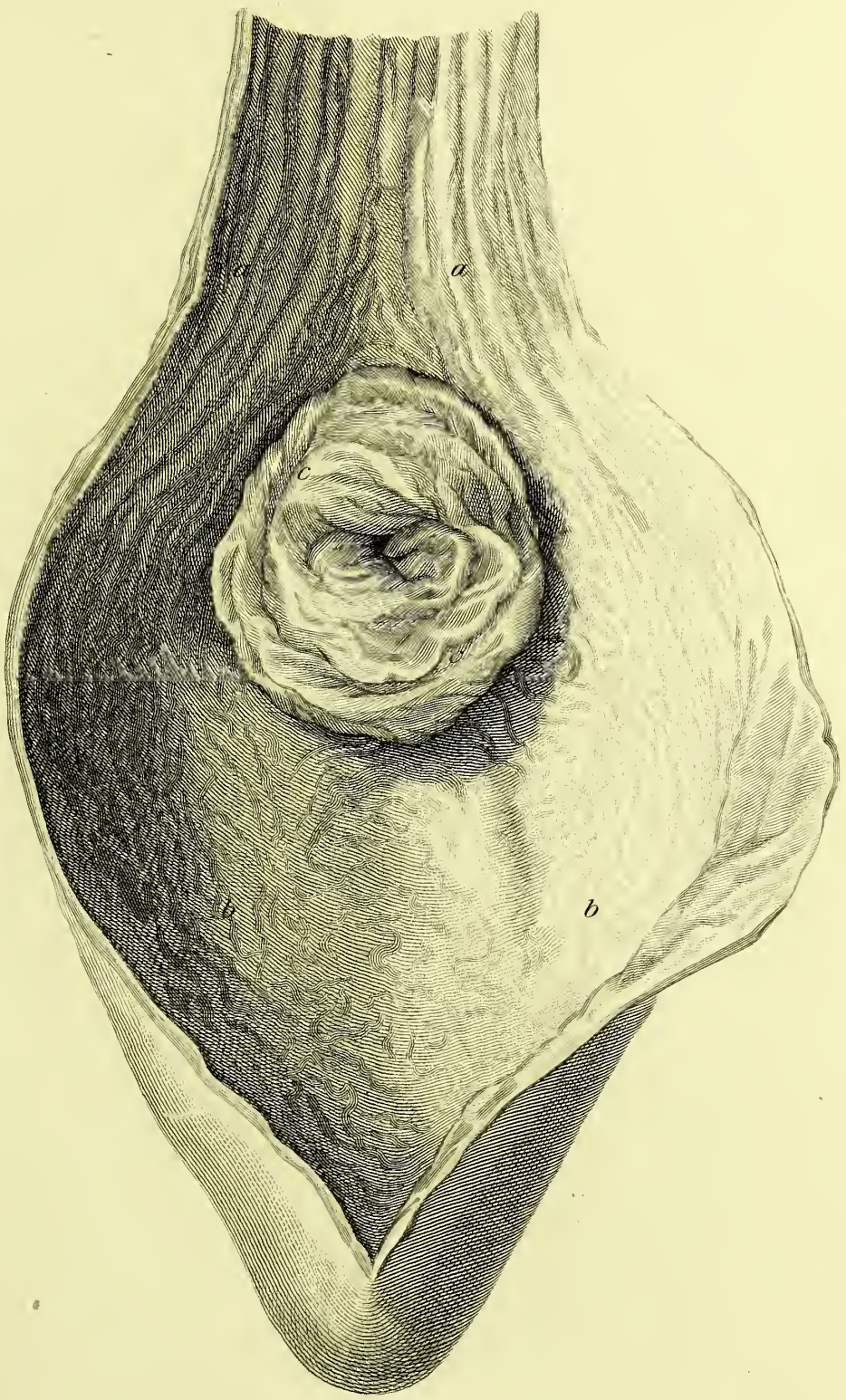
The first cavity of the stomach of the bottle-nose porpoise, laid open to shew its internal structure. On a scale of six inches to a foot.

a a. The œsophagus lined with cuticle.

b b. The first cavity of the stomach also lined with cuticle.

c c. The glandular structure, forming folds round the orifice leading to the second cavity, also lined with cuticle.

TAB. XL.



SCALE_Six Inches to a Foot.

Wm. Clift del.

Basire Sc.

TAB. XLI.

The internal surface of the second, third, and fourth cavities of the stomach of the bottle-nose porpoise. On a scale of five inches to a foot.

a a. The outside of the first cavity to shew its external form,

b b. The inner surface of the second cavity made up of a honey-combed structure, composed of soft membranous folds, which have no cuticular covering.

c c. The third cavity.

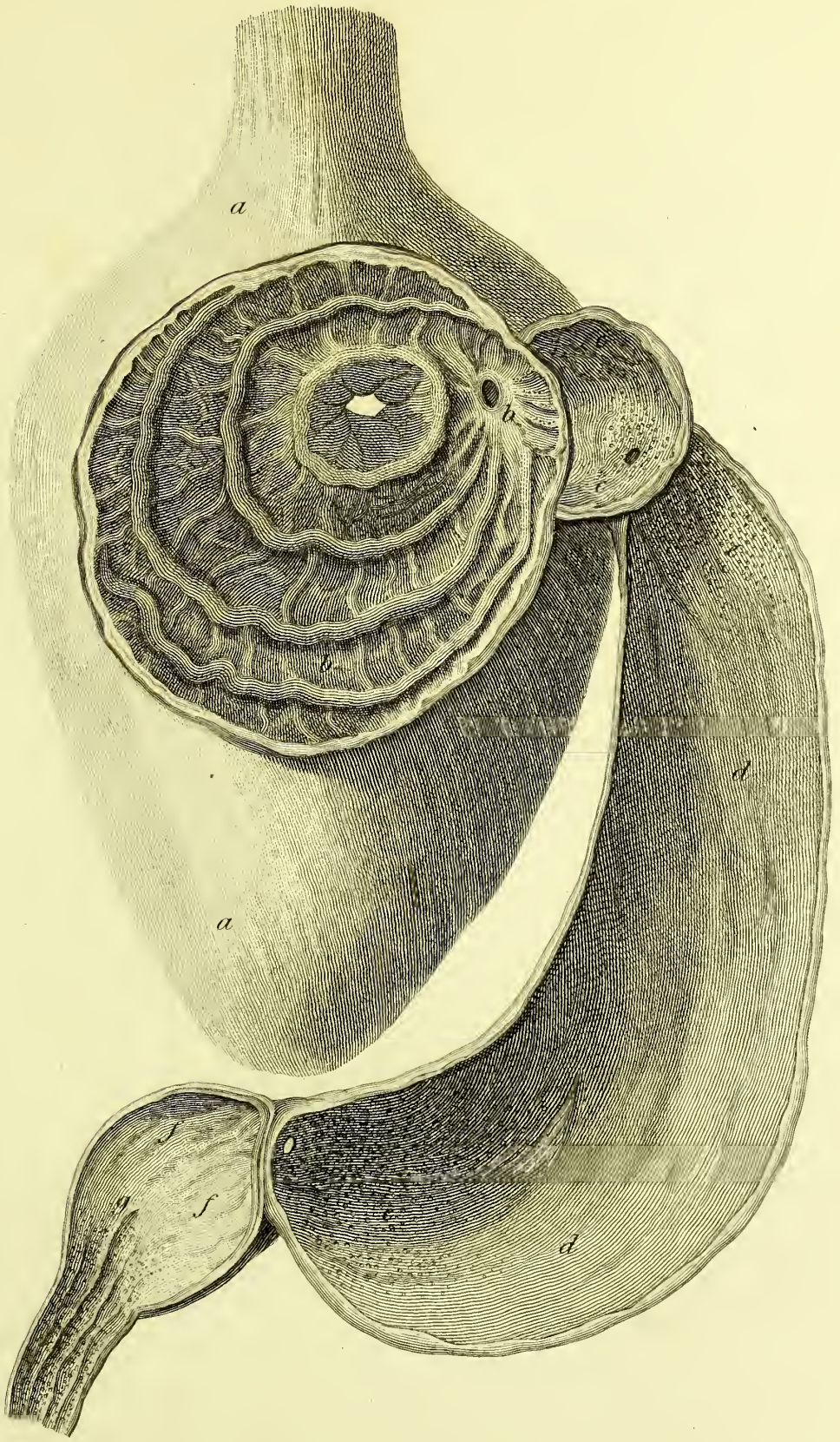
d d. The fourth cavity.

e e. The orifices of excretory ducts of glands.

f f. The enlargement of the duodenum immediately beyond the pylorus, into which the common duct from the liver and pancreas opens.

g. The opening of the common duct.

TAB. XLI.



SCALE_Five Inches to a Foot

W.m Bligh del

Basire sc

TAB. XLII.

The tusks of the male and female nar-whale imbedded in the skull.

Fig. 1. The skull of a male nar-whale, shewing the permanent tusk in its socket, the milk tusk ready to be protruded.

Fig. 2. The female skull with the two milk tusks ready to be protruded, having acquired their full size, and canals being formed, through which the points are to pass out.

Fig. 3. A section of a milk tusk, to shew that it is solid.

Fig. 4. The lower jaw, in which there is no place for teeth.

Fig. 5. A section of a full-grown tusk, to shew the cavity in the middle, and that the parts at the point and at the root are solid.

The scales to which the different figures are drawn are expressed upon the plate.

TAB. XLII.

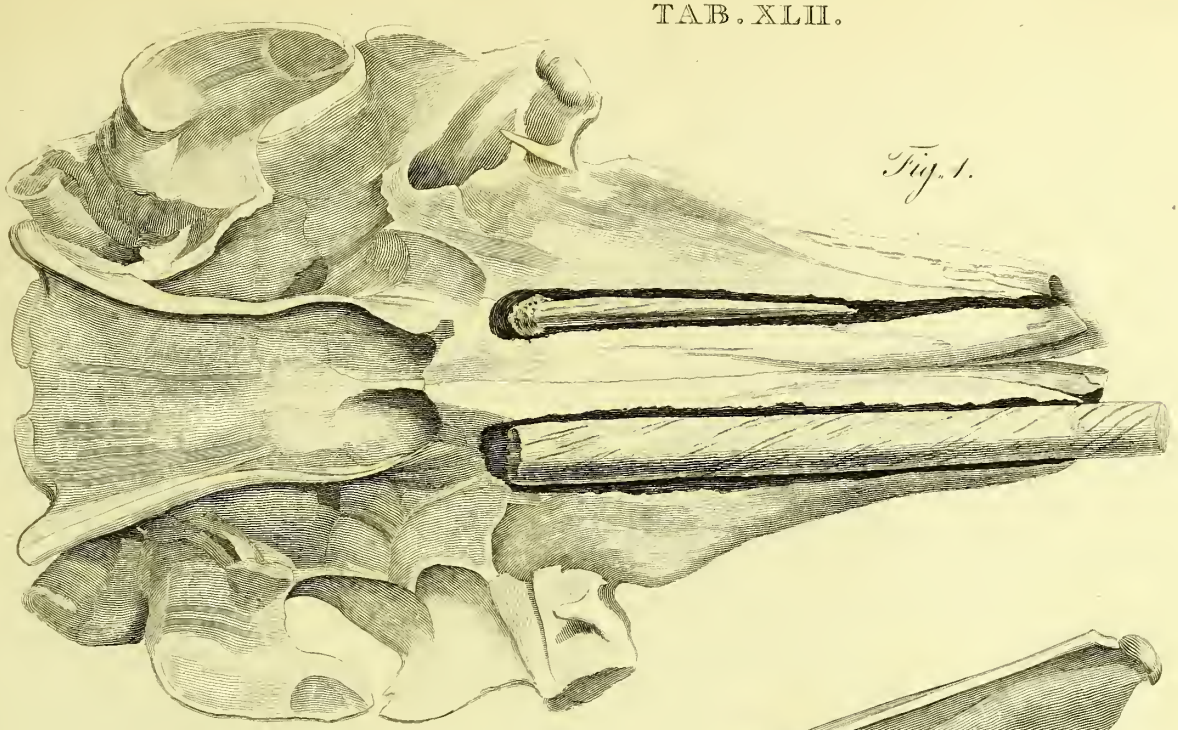


Fig. 1.

3 Inches to a Foot

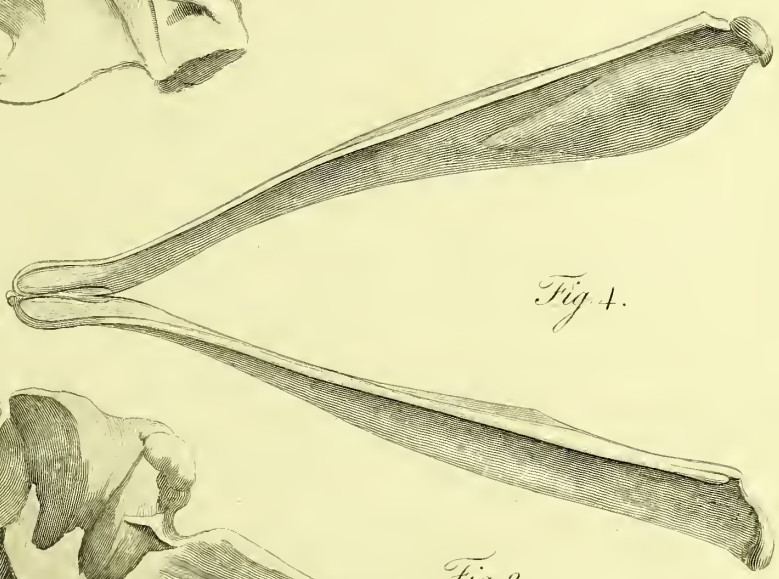


Fig. 4.

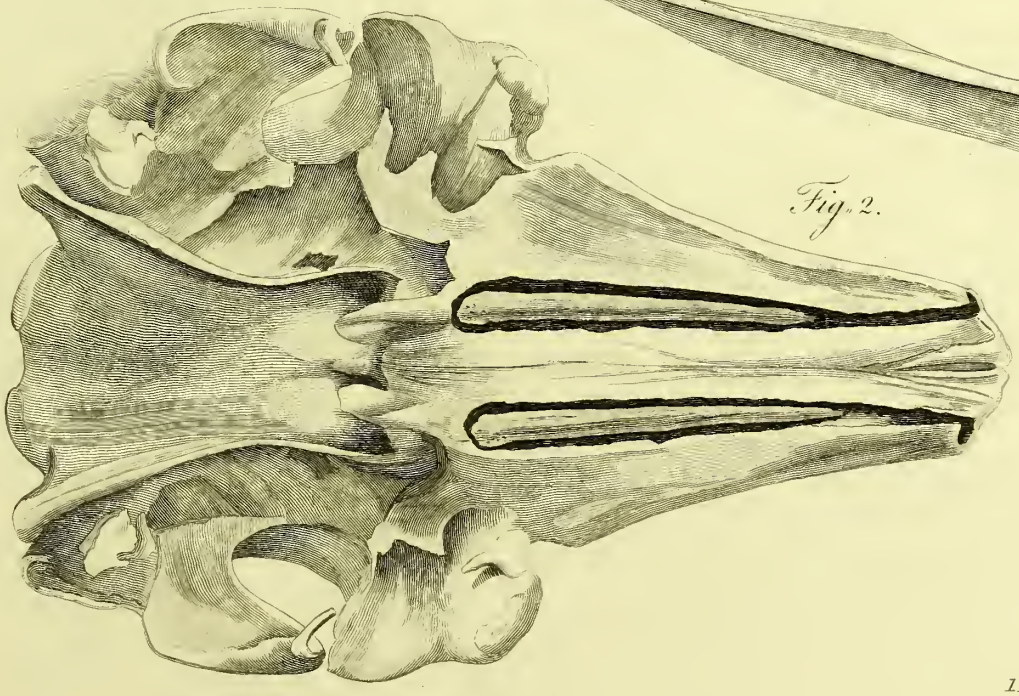


Fig. 2.

Fig. 5.

1 Inch & ½ to a Foot.

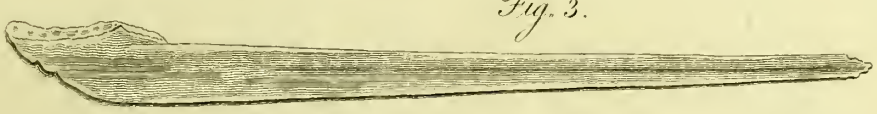


Fig. 3.

6 Inches to a Foot.

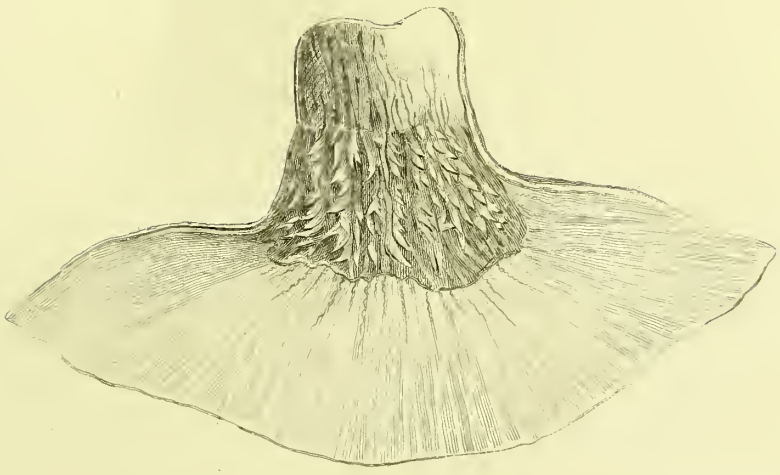
Fs. Basire sc.

TAB. XLIII.

The appearance of the cuticular papillæ on the internal membrane of the stomach of the ornithorhynchus hystrix, situated at the termination of the pylorus.

The parts are of the natural size.

TAB. XLIII.



TAB. XLIV.

Fig. 1. The external appearance of the stomach of the hawk of the natural size.

a. The œsophagus.

b b. The cardiac portion.

c. The pyloric portion.

Fig. 2. The internal appearance of the same stomach.

a. The œsophagus.

b. The gastric glands.

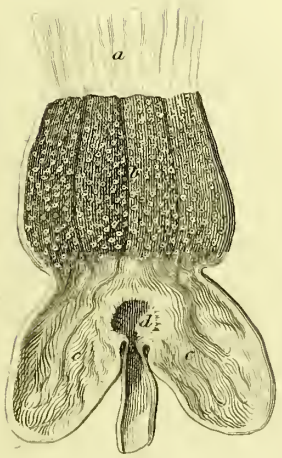
c c. The cardiac portion.

d. The pyloric portion. At the beginning of the duodenum is the opening of the duct of the liver.

TAB. XLIV.

Fig. 1.

Fig. 2.

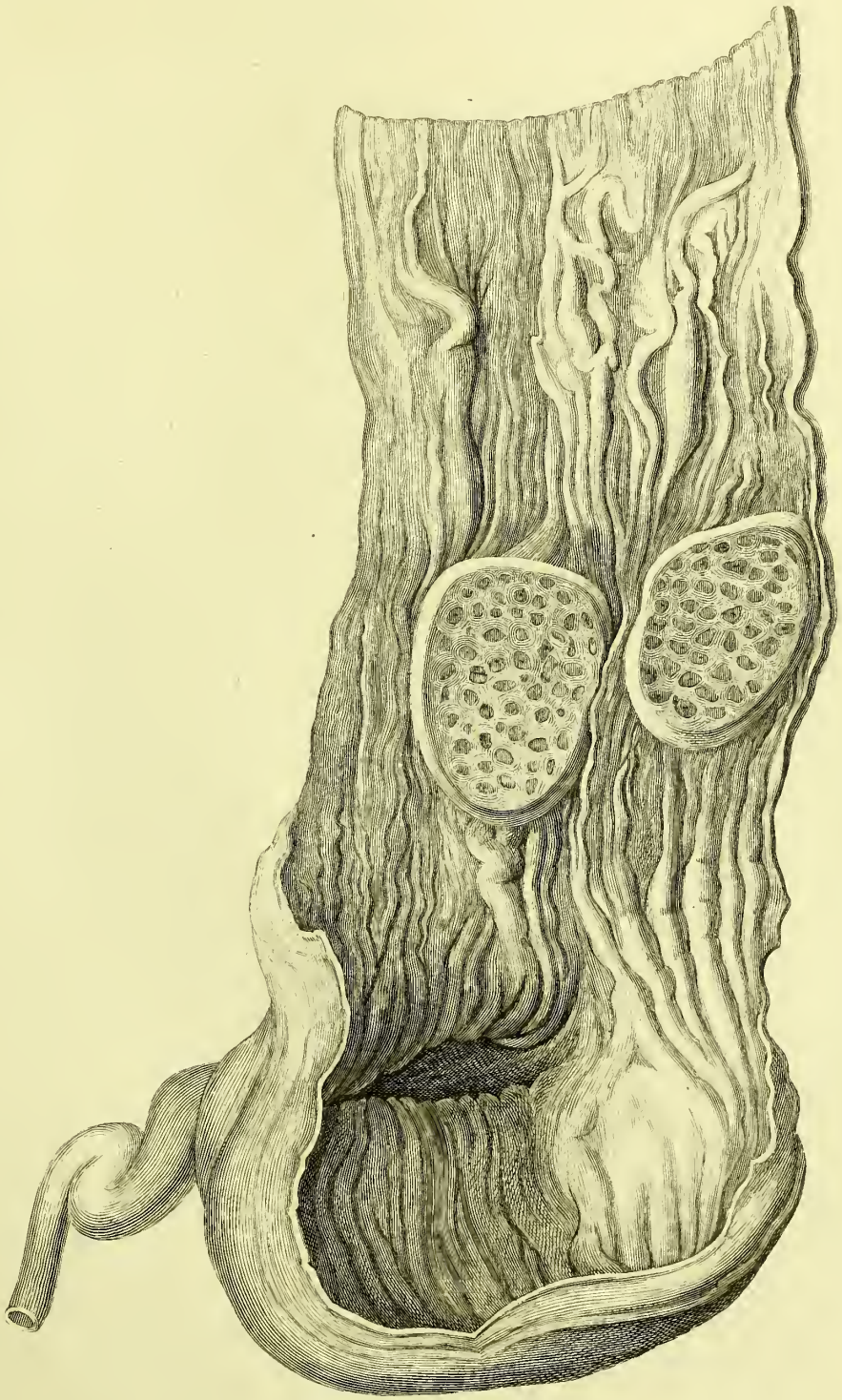


TAB. XLV.

The appearance of the internal surface of the stomach of the ardea argala of Bengal, shewing the gastric glands disposed in two circular masses, one on the anterior, the other on the posterior surface of the cardiac cavity.

On a scale of half an inch to an inch.

TAB. XLV.



J. Houship del.

P. Basire sc.

TAB. XLVI.

The gizzard of the Soland goose laid open, to shew the situation and appearance of the gastric glands.

The figure is of the natural size.

TAB. XLVI.

W. Clift del.

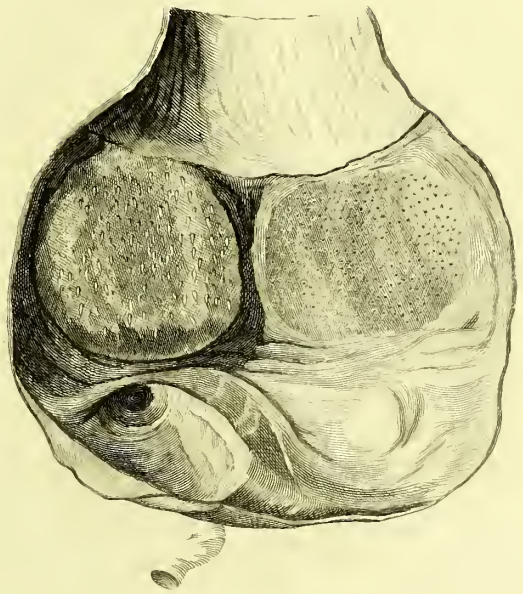
J.s Basire sc.

TAB. XLVII.

The stomach of the cormorant laid open, and the internal parts exposed, particularly the gastric glands. On one portion the orifices are seen empty, on the other, they are covered with mucus in a coagulated state.

The figure is on a scale of half an inch to an inch.

TAB. XLVII.



TAB. XLVIII.

The form and internal structure of the cardiac cavity and gizzard, in the woodpecker, the sea-gull, and the little auk, all of the natural size.

Fig. 1. The external appearance of the cardiac cavity and gizzard in the woodpecker.

Fig. 2. The internal appearance of the cardiac cavity and gizzard of the woodpecker.

Fig. 3. The internal appearance of the cardiac cavity, and gizzard in the sea-gull.

Fig. 4. The internal appearance of the cardiac cavity and gizzard of the little auk.

TAB. XLVIII.

Fig. 1.

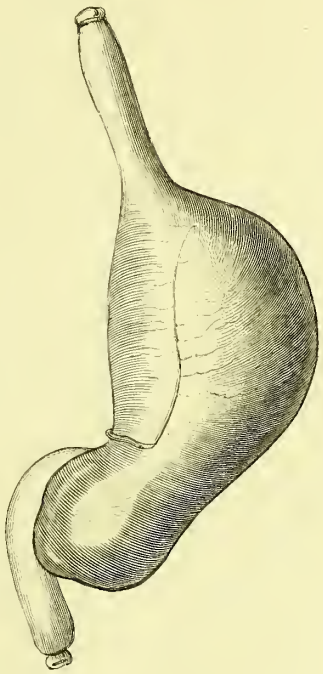


Fig. 2.

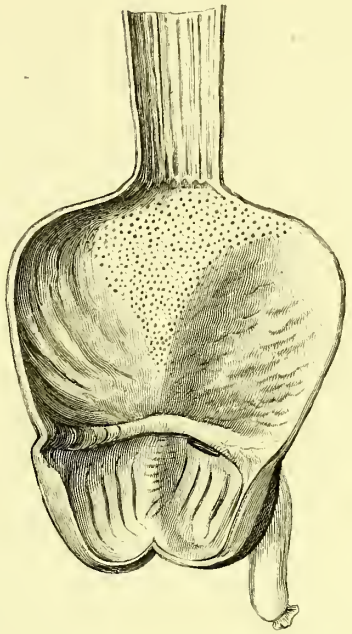


Fig. 3.

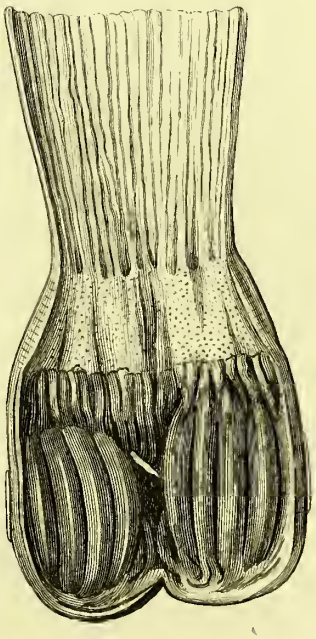
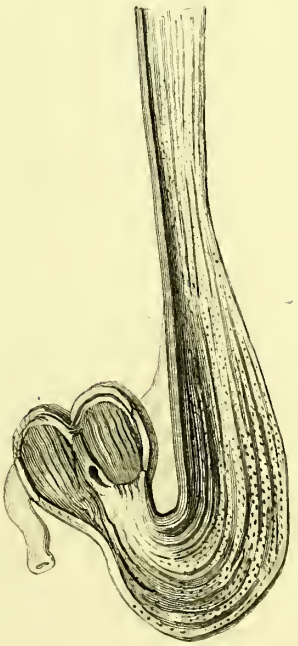


Fig. 4.



W. Clift del.

Js. Basire sc.

TAB. XLIX.

The gizzard of a turkey, with a portion of the œsophagus and duodenum attached to it. The œsophagus and duodenum are both laid open to expose their glandular structures; but the gizzard itself is entire, and is drawn of the natural size.

a. The œsophagus immediately below the crop, covered with a cuticle.

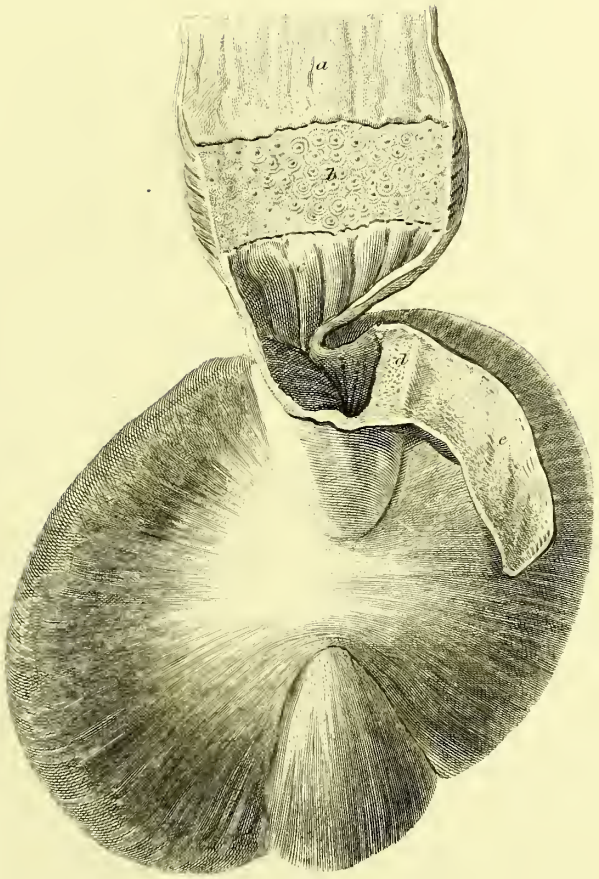
b. The openings of the gastric glands, placed on a surface that has no cuticular covering.

c. Horny ridges between the gastric glands and the lining of the gizzard.

d. A minutely granulated surface between the cavity of the gizzard and the duodenum.

e. The inner surface of the duodenum.

TAB. XLIX.



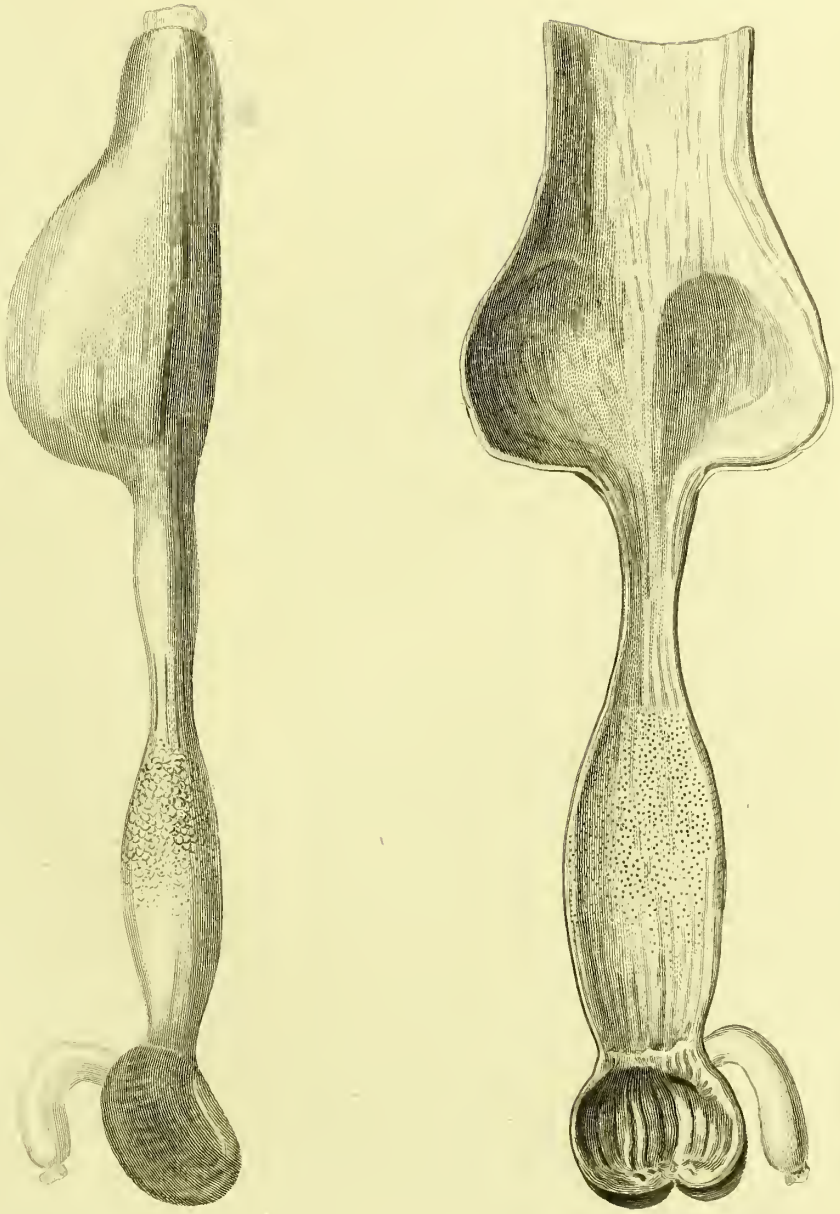
TAB. L.

Two views of the digestive organs of the parrot; of the natural size.

Fig. 1. An external view of the crop, cardiac cavity, and gizzard.

Fig. 2. An internal view of the same parts.

TAB. L.



W. Clift del.

J. Basire sc.

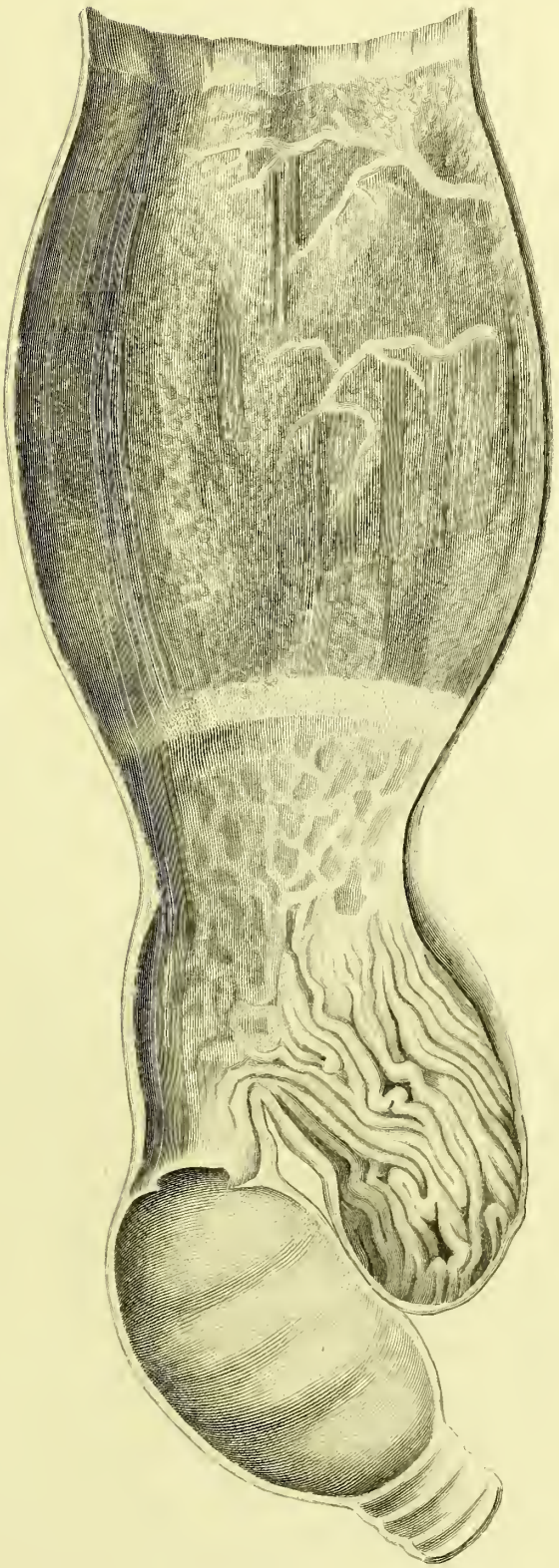
TAB. LI.

The digestive organs of the casuarius emu, to shew the situation of the gastric glands in the cardiac cavity; they occupy the whole surface, which is very large, and are placed nearly in a transverse direction respecting the cavity, the orifices of the excretory ducts appearing very distinctly through the membrane which lines the cavity. They are one-fourth of an inch long and only one sixteenth of an inch wide.

The gizzard is situated out of the direction of the cardiac cavity, forming a pouch, leaving an open channel lined with cuticle, along which the food can readily pass into the duodenum, without being received into the gizzard, as in other birds.

On a scale of six inches to a foot.

TAB. LI.



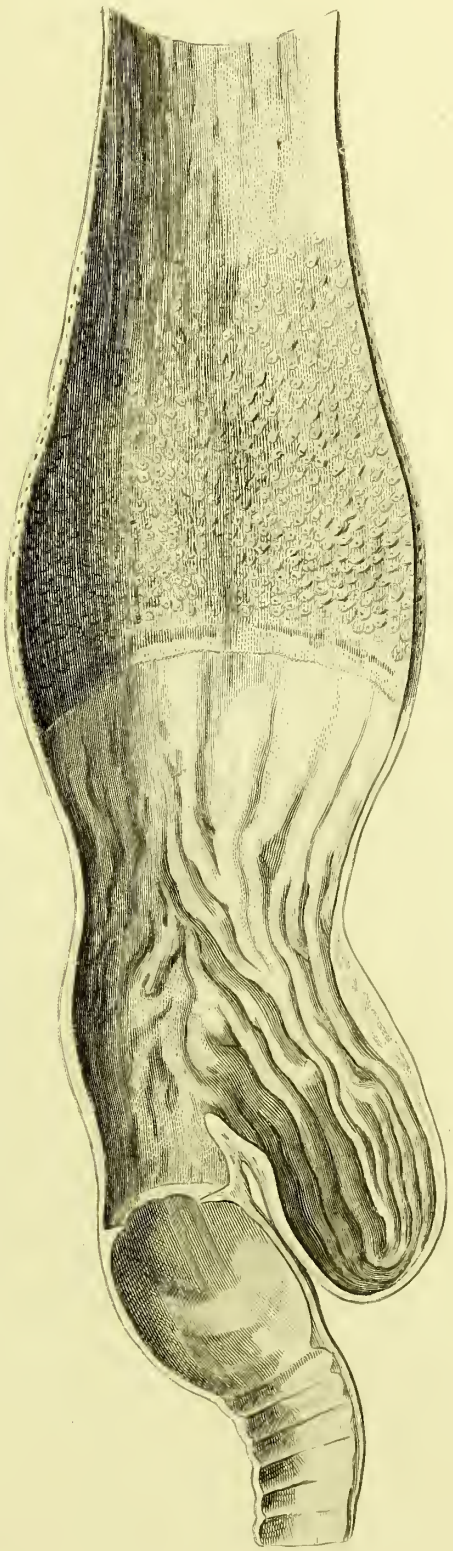
J. Hourship del.

Le Bastire sc

TAB. LII.

The digestive organs of the long-legged cassowary from New South Wales, on a scale of six inches to a foot. The gastric glands are of the same length as those of the emu, but are twice the width; they occupy the whole surface of the cardiac cavity; in the middle line there is a row of these glands in the direction of the cavity, and on the two sides the glands are arranged in an oblique direction towards this line. The gizzard is rather stronger than in the emu, but resembles it in all other respects. The duodenum at its origin is by no means so large.

TAB. LII.



J. Houship del.

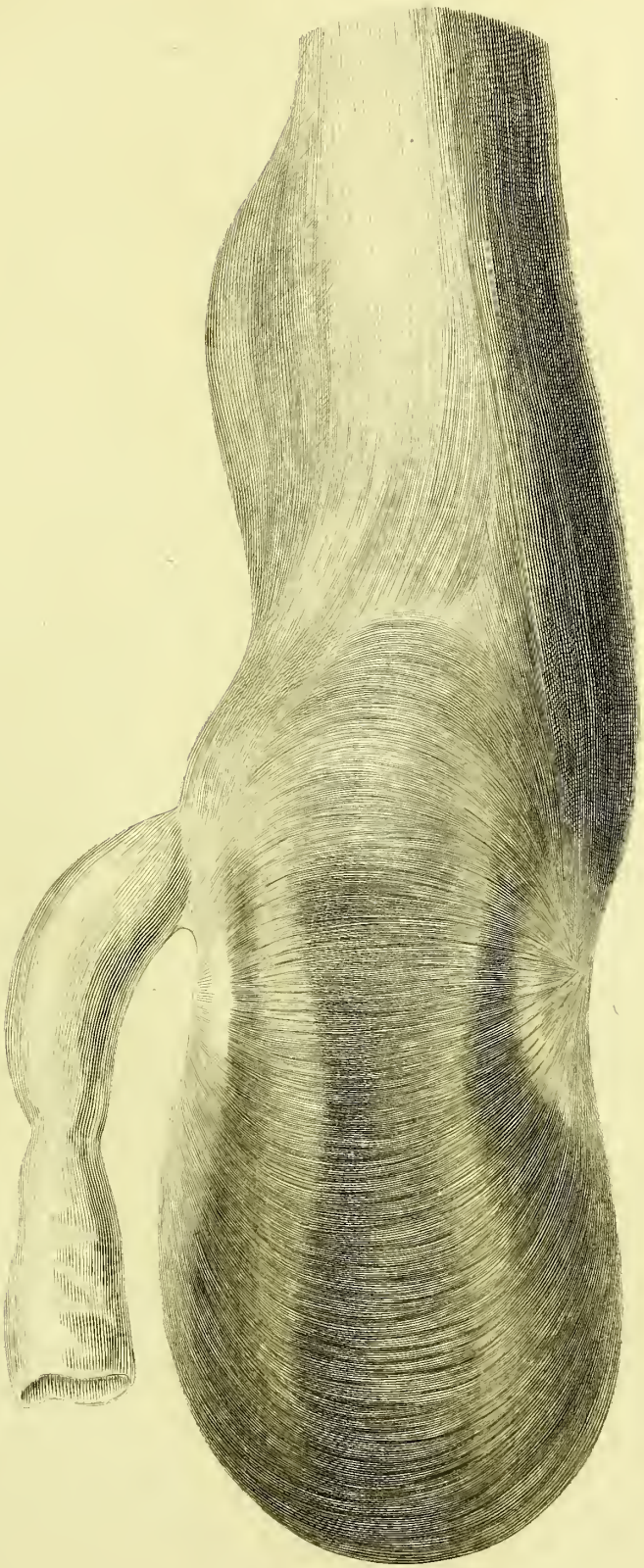
E. Basire sc.

TAB. LIII.

An external view of the cardiac cavity and gizzard of the American ostrich.

On a scale of eight inches to a foot.

TAB. LIII.



W. Clift. del.

Js Basire sc

TAB. LIV.

An internal view of the cardiac cavity and gizzard of the American ostrich. On a scale of eight inches to a foot. The orifices of the gastric glands are very conspicuous in the cardiac cavity.

TAB. LIV.

W. Clift del.

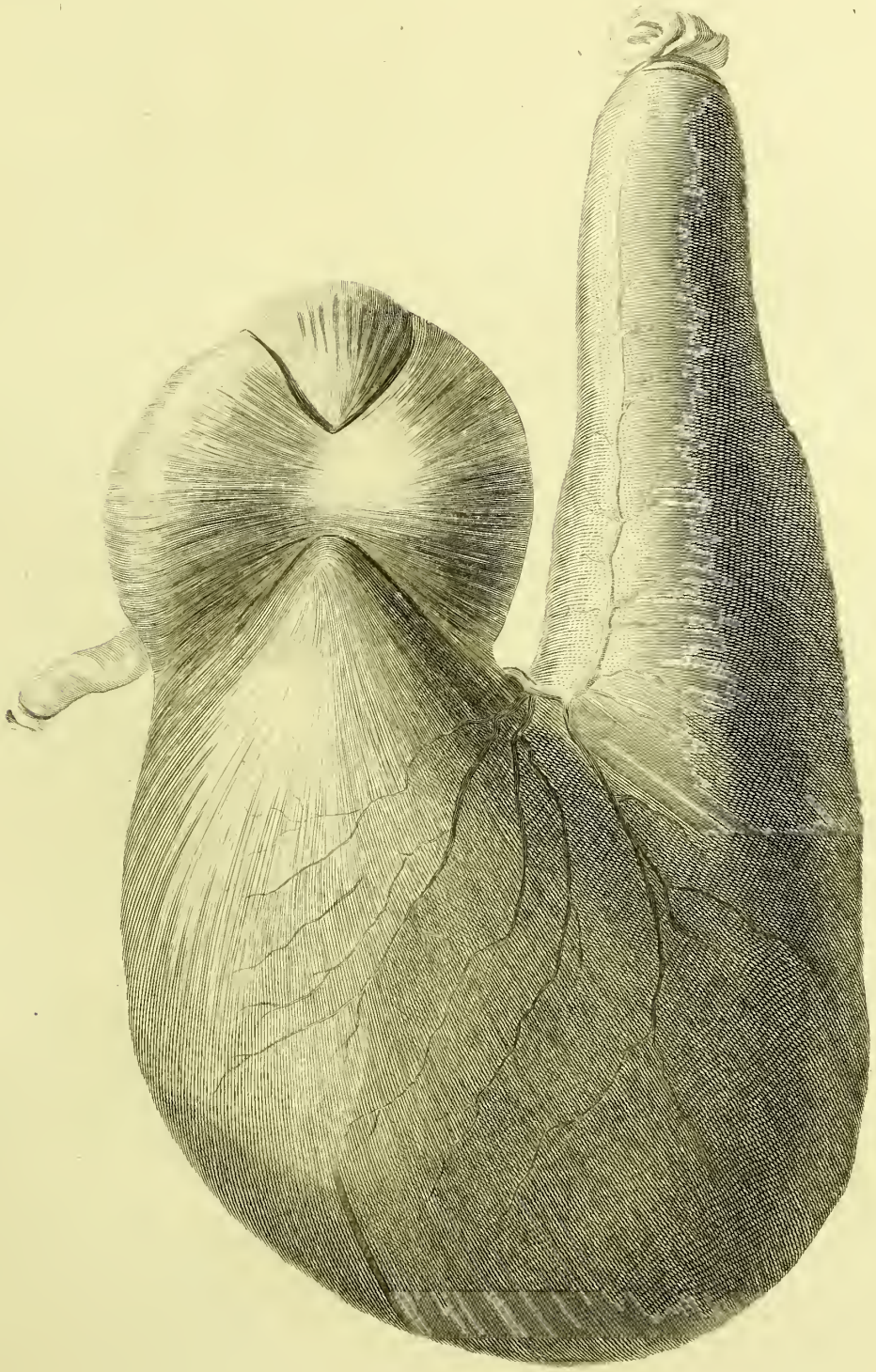
B. Basire sc

TAB. LV.

An external view of the cardiac cavity and gizzard of the African ostrich.

On a scale of two inches to a foot.

TAB. LV.



W. Clift. del.

J.s Basire sc.

TAB. LVI.

An internal view of the African ostrich's gizzard, and also a series of gastric glands belonging to different birds.

Fig. 1. The internal surface of the cardiac cavity and gizzard of the African ostrich, on a scale of two inches to a foot.

Fig. 2. A series of gastric glands of different birds, to sbew the appearances they put on. All drawn of the natural size.

Solvent Glands. TAB. LVI.

For Animal Food.

Eagle

Soland Goose

Sea Gull

For Vegetable Food.

Pigeon

Swan

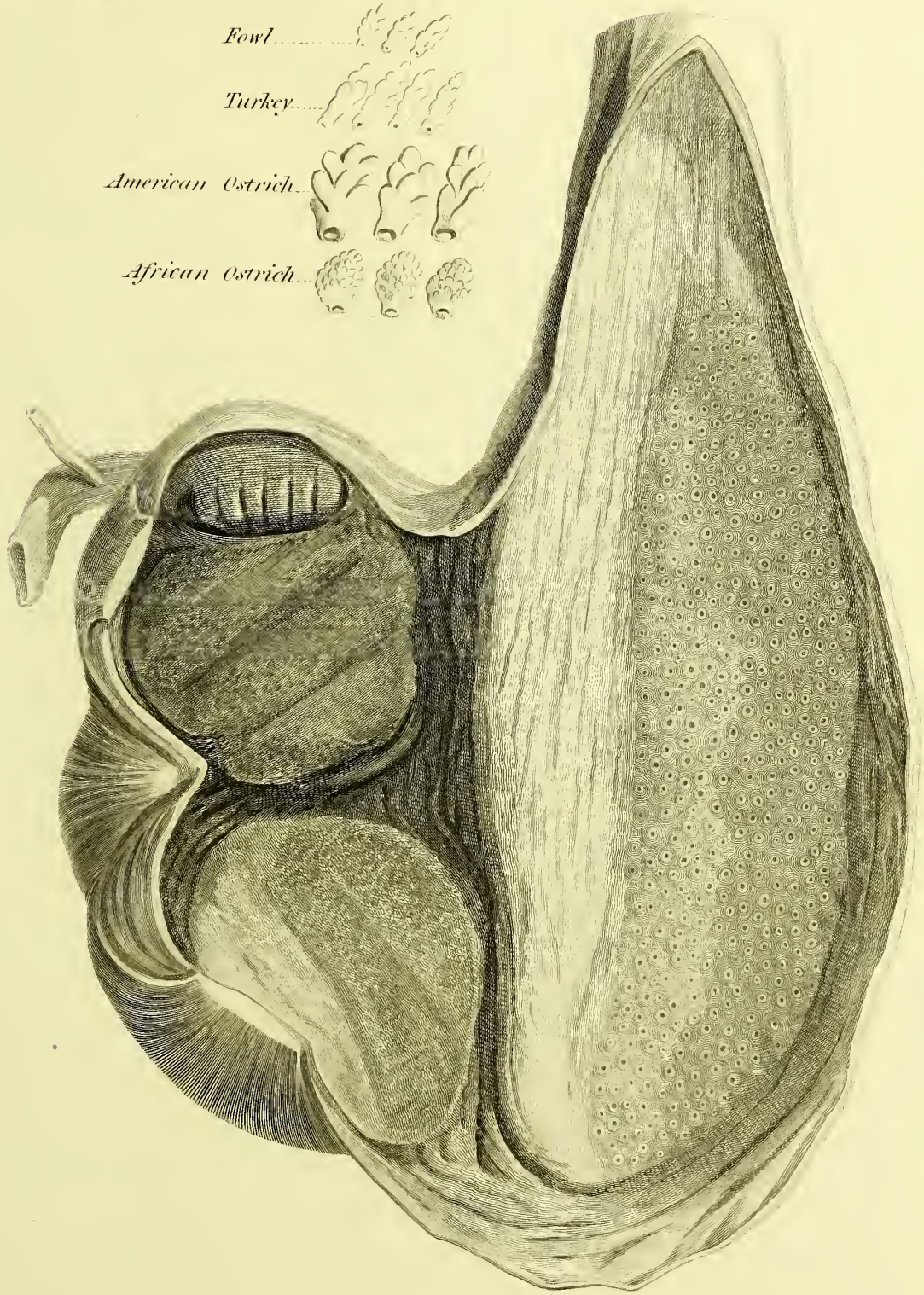
Goose

Fowl

Turkey

American Ostrich

African Ostrich



W. Clift del.

T. Bonsire sc.

TAB. LVII.

A view of the bill and throat of the ornithorhynchus hystrix, laid open to shew the tongue and palate. Of the natural size.

a. The tongue in its natural situation.

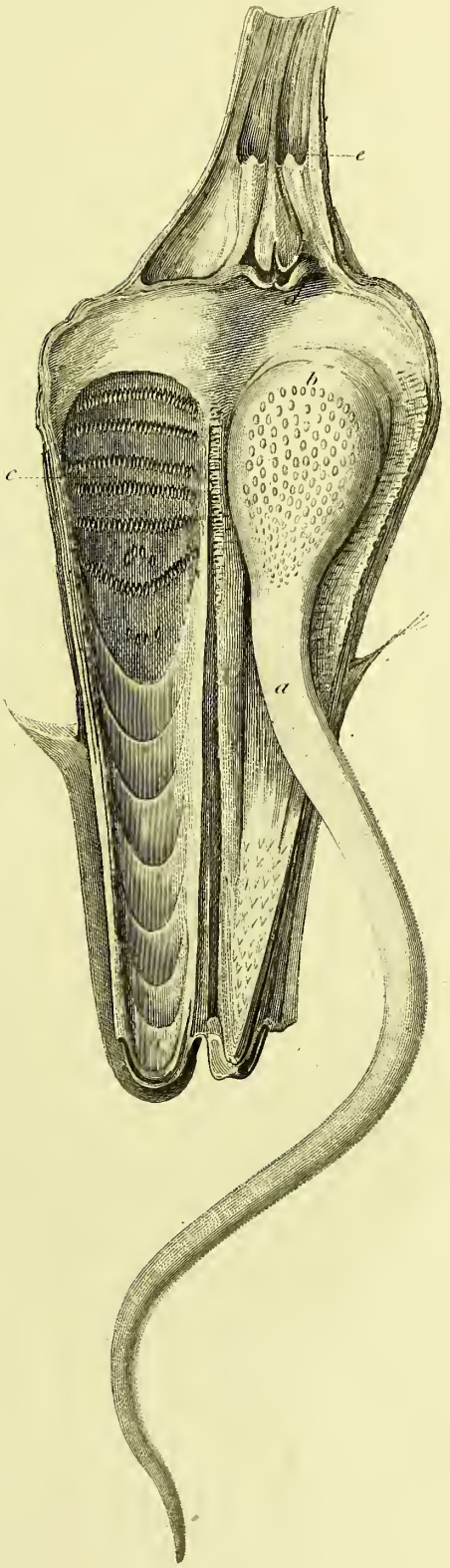
b. The cuticular teeth upon the tongue.

c. The cuticular teeth upon the palate.

d. The bifid epiglottis immediately above the glottis.

e. The valvular projection at the beginning of the œsophagus.

TAB. LVII.



TAB. LVIII.

Different views of the head of the ornithorhynchus paradoxus. Of the natural size.

Fig. 1. A view of the beak, to shew the situation of the openings of the external nostrils, marked a a.

Fig. 2. Another view of the beak, exposing the under portion.

Fig. 3. A lateral view to shew the opening of the lips, and the situation of the eye and ear.

a. The eye.

b. The ear.

TAB. LVIII.

Fig. 1.

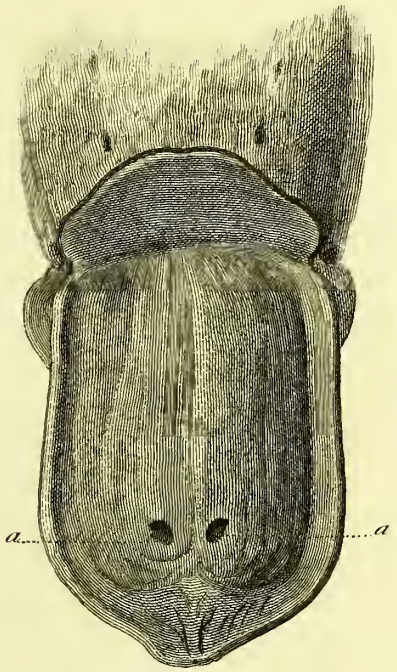


Fig. 2.

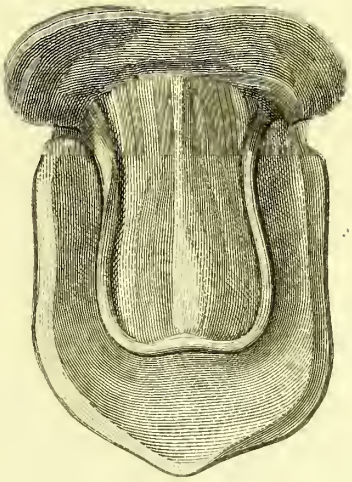
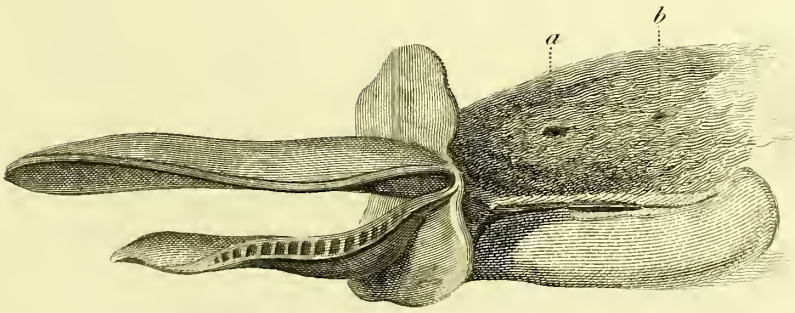


Fig. 3.



Bafire fc

TAB. LIX.

Different views of the first set of cuticular teeth in the ornithorhynchus paradoxus. Of the natural size.

Fig. 1. A view of the upper jaw and palate, to shew that there are two grinding teeth on each side.

Fig. 2. A similar view of the under jaw.

Fig. 3. The bones which form the beak delineated; and the soft surrounding parts only marked in outline.

Fig. 4. A similar view of the bones forming the lower portion of the beak.

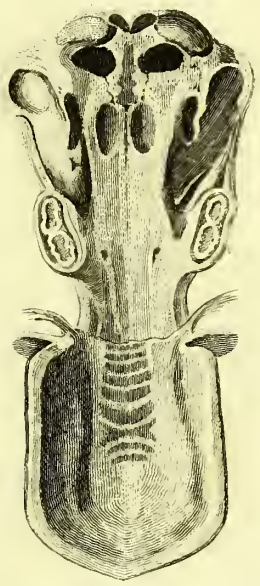


Fig. 1.

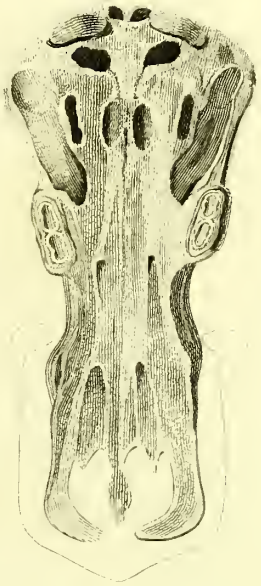


Fig. 3.

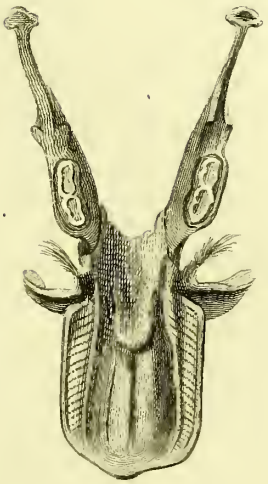


Fig. 2.

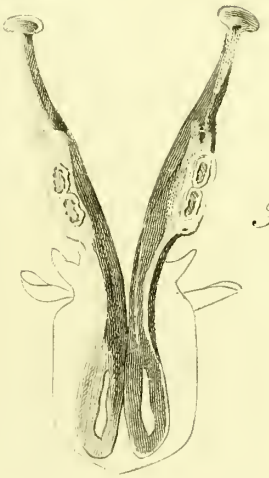


Fig. 4.

Bajire fc

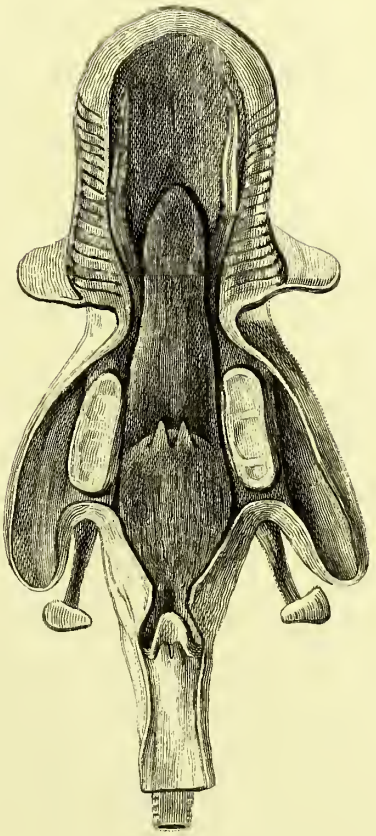
TAB. LX.

The under jaw of the full-grown ornithorhynchus paradoxus, to shew that there is only one grinder on each side, and two pointed teeth upon the tongue itself.

On the outside of the jaw, on each side, are the pouches for the food.

The figure is represented of the natural size.

TAB. LX.

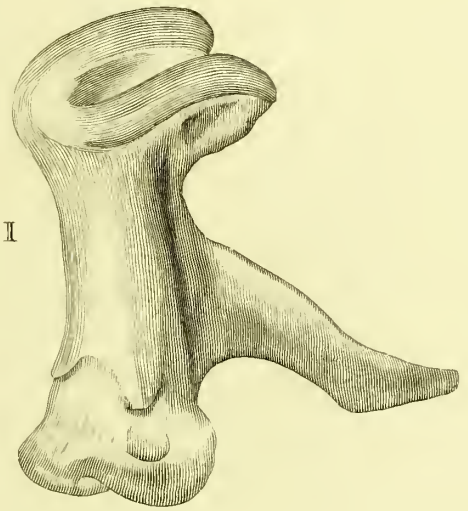


TAB. LXI.

Interarticular bones of the jaws of birds, to shew the different situations of the process to which the muscle that moves the upper mandible is attached. On a scale of one-quarter of an inch to an inch.

TAB. LXI.

I



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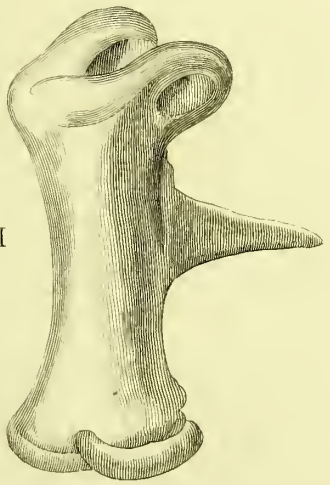

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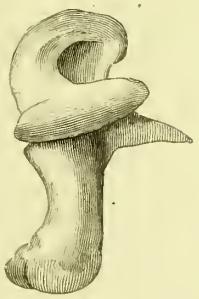


I. BUSTARD. II. SOLAND GOOSE. III. PARROT.

W. Cliff del. J. Basire sc.

TAB. LXII.

The gizzard of a turkey laid open on its anterior part, to shew the form of the internal cavity, which is oval, and the grinding surfaces uniformly concave. Of the natural size.

TAB. LXII.

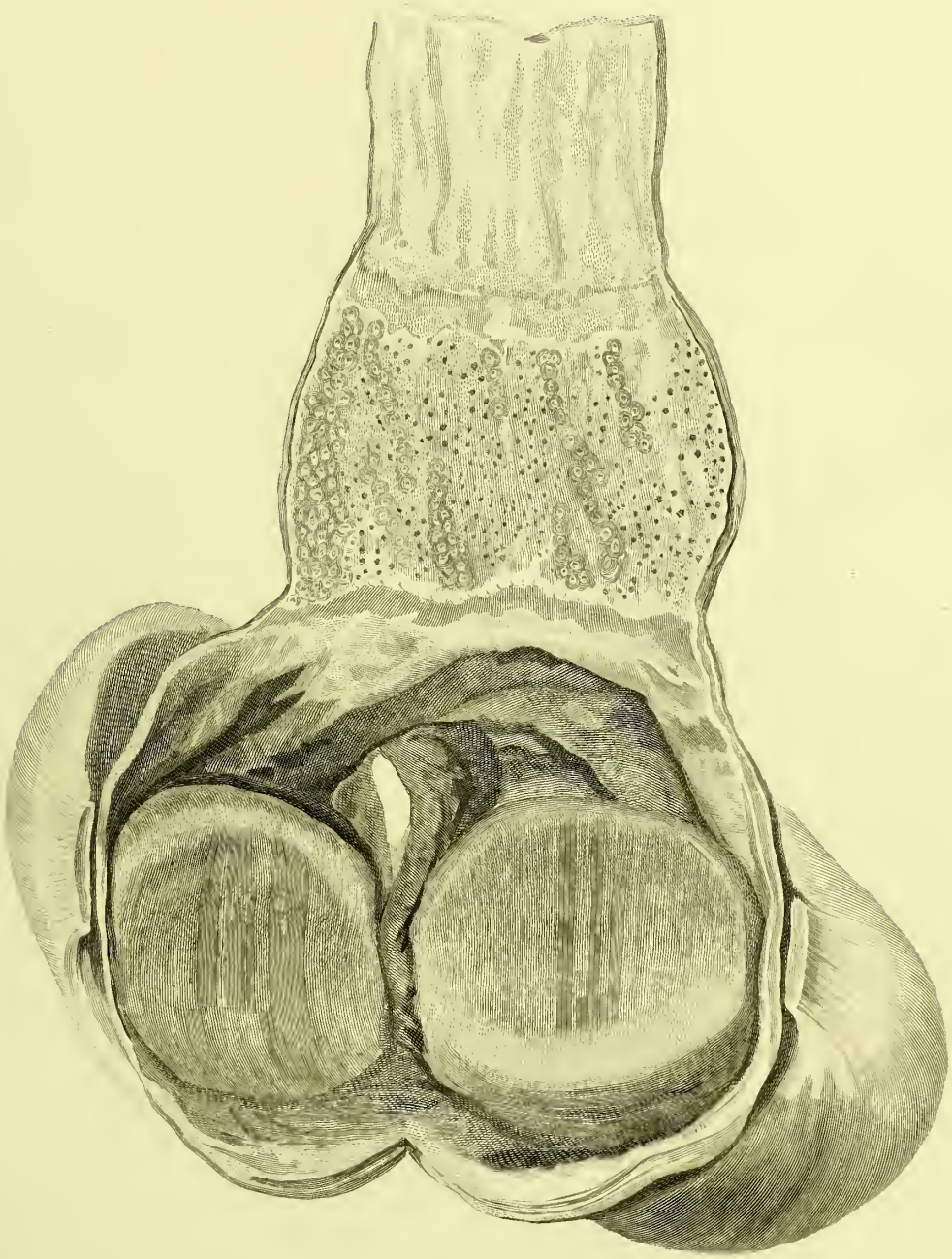
W. Clift del.

Fs. Bauerr sc.

TAB. LXIII.

The gizzard of a swan exposed in the same way as that of the turkey in the last engraving. The grinding surfaces have an oval form, but in an opposite direction to those of the turkey, and each of them is made up of a ridge and a hollow, in the direction of the oval, which are adapted to those of the opposite side, the ridge of the one fitting the hollow of the other. Of the natural size.

TAB. LXIII.



W. Clift del.

T. Basire sc.

TAB. LXIV.

Fig. 1. The stomach of the English viper laid open, to shew its internal surface. Of the natural size.

Fig. 2. The stomach of the turtle, exposing one-half of its cavity. On a scale of half an inch to an inch.

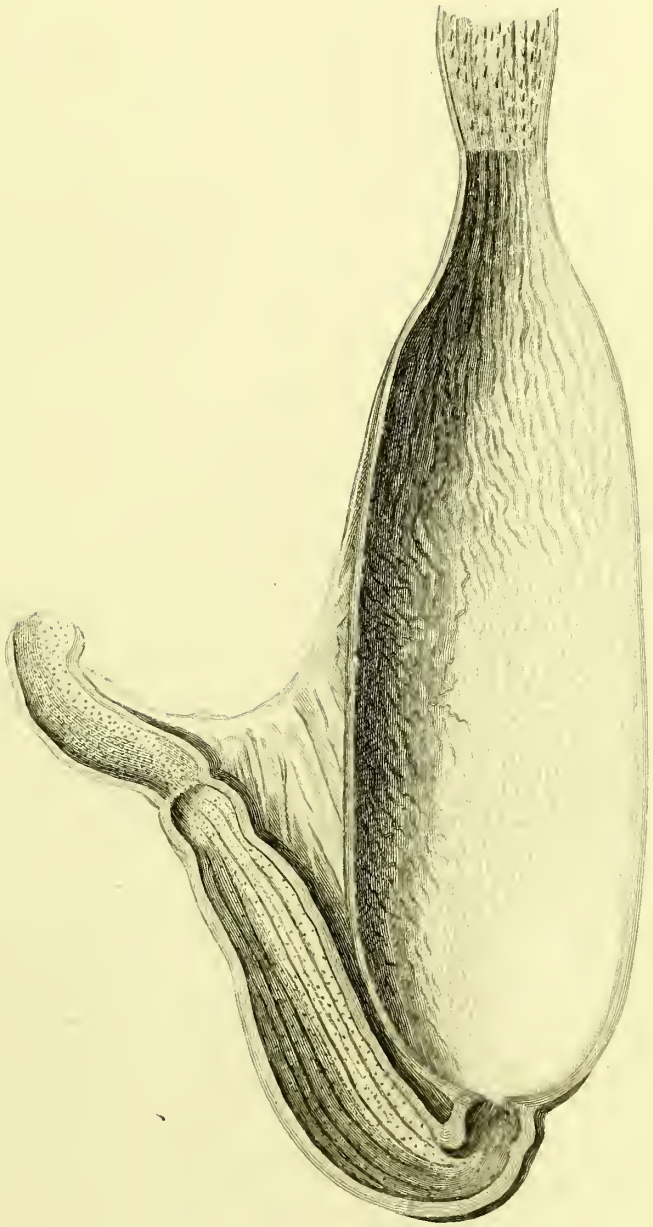
Fig. 3. The stomach of the frog, exposed in the same manner. Of the natural size.

TAB. LXIV.

Fig. 1.

Fig. 3.

Fig. 2.



Half an Inch to an Inch.

TAB. LXV.

Teeth of venomous and innocuous Snakes. The names are those used by Dr. Russel.

Fig. 1. The skeleton of the head of the tar tutta, which is an innocuous snake. The two rows of teeth seemingly situated in the palate, are fixed in that portion of the bone which constitutes the principal part of the upper jaw; and the marginal row is fixed in an exterior portion, which is weaker than the other.

Fig. 2. The same view of the skeleton of the head of the katuka rekula poda. There is a crooked poisoning fang fixed in a strong bony socket, and between this socket and the margin of the mouth latterly, there is a slender bone connected to the socket and jaw, which corresponds with that portion of the jaw in which the marginal row of teeth is inserted in the tar tutta, as well as in all other innocuous snakes.

Fig. 3. A side view of the upper jaw of the bungarum pamah.

Fig. 4. A side view of the upper jaw of the cobra de capello.

Fig. 5. A side view of the upper jaw of the katuka rekula poda. The situation of the jaw is reversed, as the parts could not be so distinctly seen in any other way. The fang is erected, and its socket, as well as the articulation with the skull, are distinctly seen.

Fig. 6. The same parts when the fang is recumbent.

Fig. 7. The poisoning fang in its socket detached from the skull, to show the orifice at its base, which receives the poison, and that at the point, by which it is instilled into the wounded animal.

TAB. LXV.

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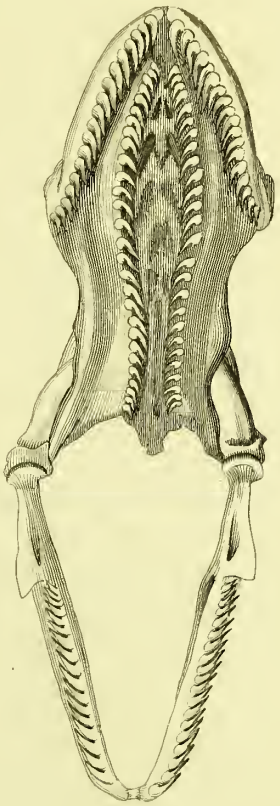

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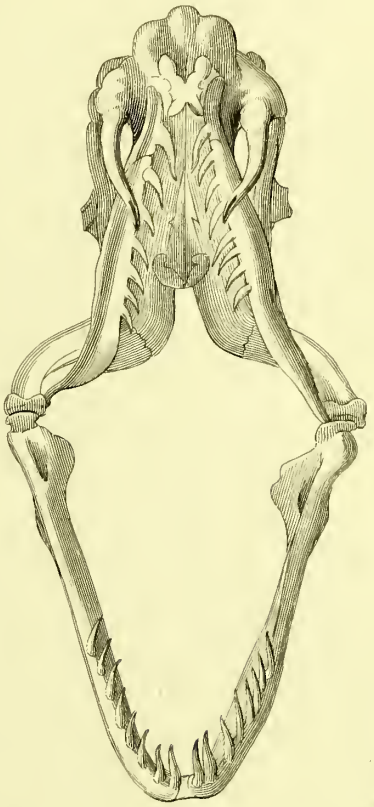

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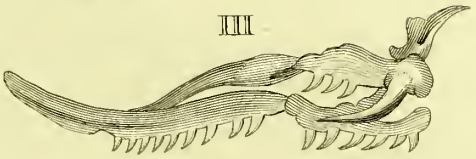

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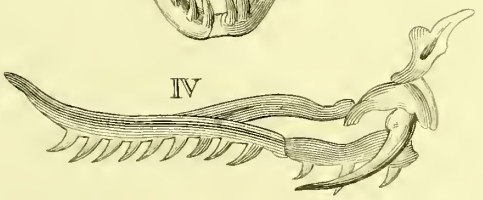

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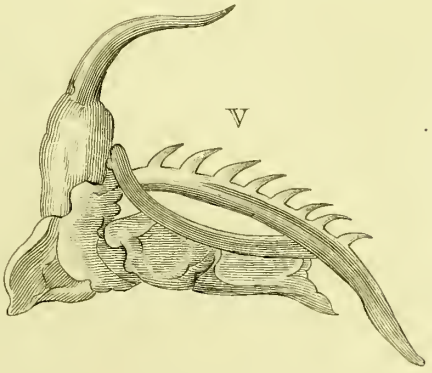
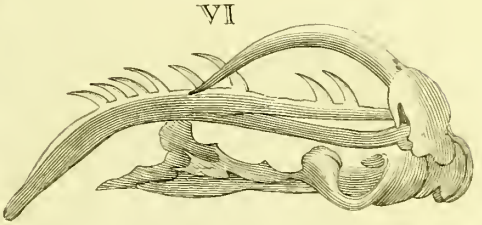


VII

VI



TAB. LXVI.

The internal surface of the stomach of the cod-fish. Of the natural size.

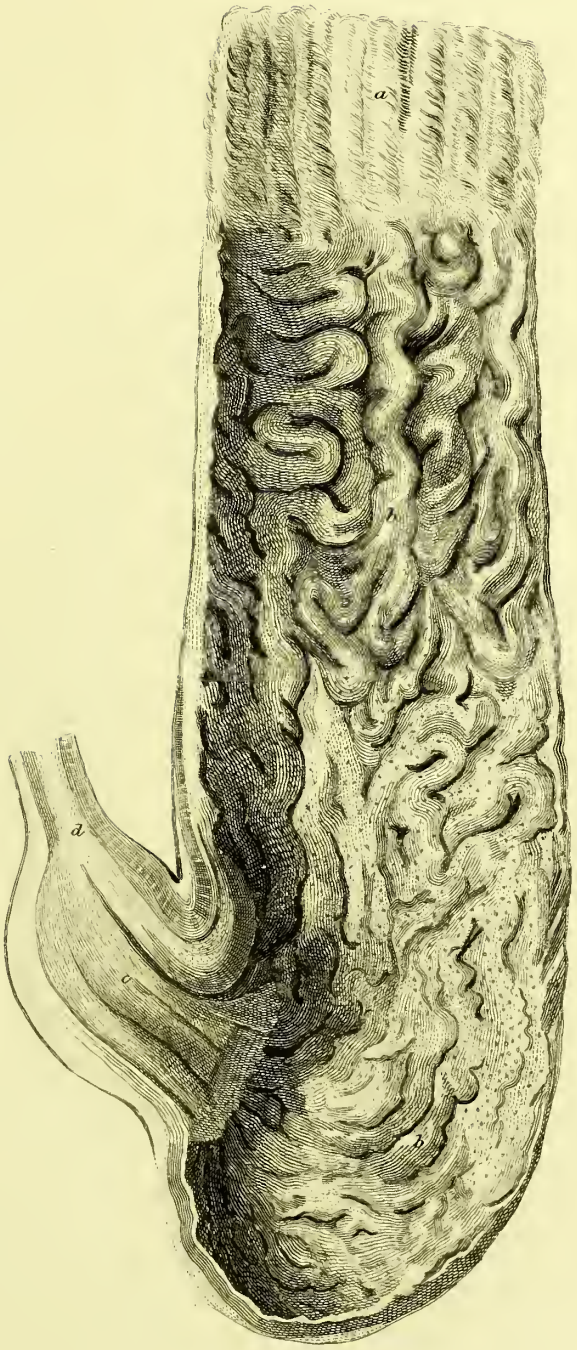
a. The œsophagus lined with a cuticle, having small processes projecting from it.

b b. The cardiac portion of the stomach, the inner membrane of which is soft and rugous, forming longitudinal folds, and having orifices of glands upon the projecting ridges.

c. The pyloric portion.

d. The pylorus.

TAB. LXVI.



TAB. LXVII.

The stomach of the squalus acanthius of Linnæus, an oviviviperous shark, laid open to shew the internal surface. Of the natural size.

a. The internal membrane of the œsophagus.

b. The termination of the œsophagus.

c c. The cardiac portion of the stomach.

d. The pyloric portion.

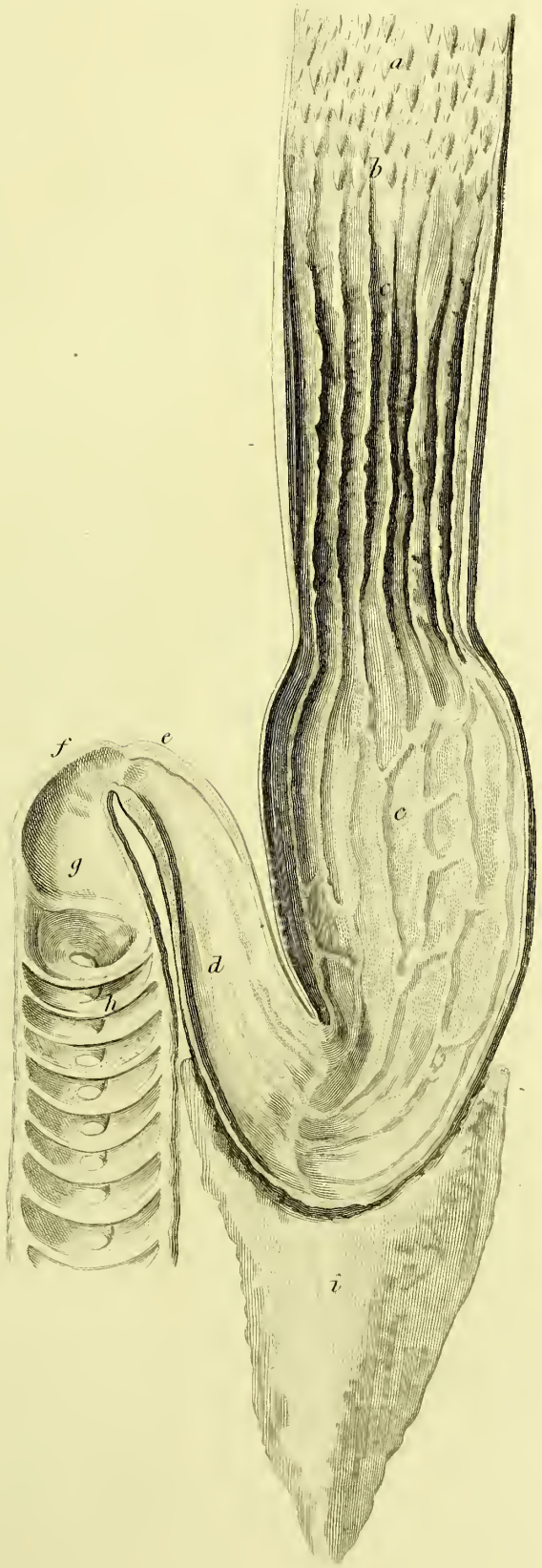
e The pylorus.

f. A small space between the termination of the pylorus and the beginning of the duodenum.

g. The duodenum.

h. The valvular part.

TAB. LXVII.



Wm Clift del.

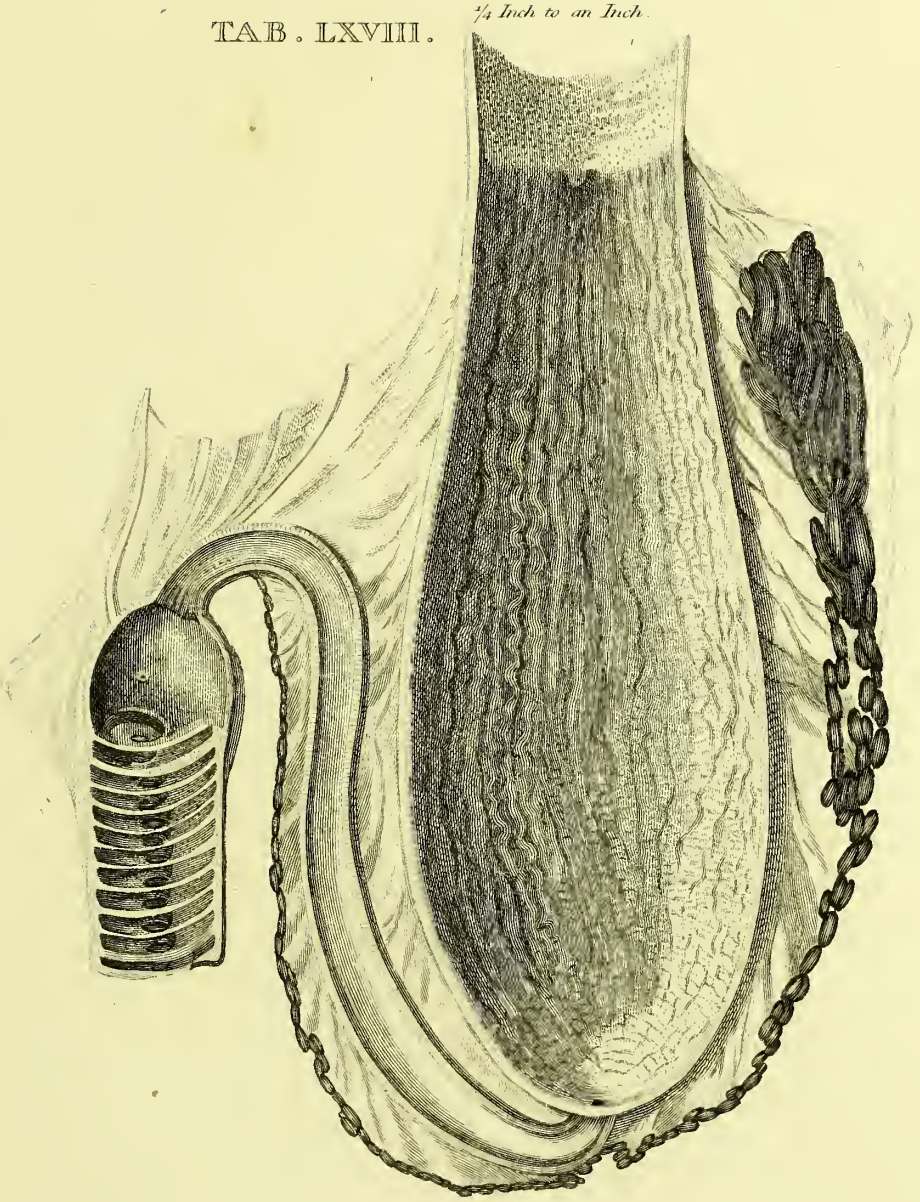
Js Basire sc.

TAB. LXVIII.

A longitudinal section of the stomach of the blue shark. On a scale of one-quarter of an inch to an inch.

TAB. LXVIII.

¼ Inch to an Inch.



TAB. LXIX.

Fig. 1. An internal view of the stomach and duodenum of the squalus maximus. On a scale of one inch to a foot.

a. The œsophagus.

b b. The cardiac portion of the stomach.

c c. The pyloric portion.

d d. The spleen.

e. A small cavity belonging to the stomach.

f f. The duodenum.

g. The band containing the hepatic ducts, six in number.

h. The dilatation in which the gall ducts terminate.

i. The opening of the pancreatic duct.

k. The spiral turns of the intestine.

Fig. 2. A portion of the fringe at the termination of the œsophagus. Of the natural size.

TAB. LXIX.

One Inch to a Foot.

Fig. 1.

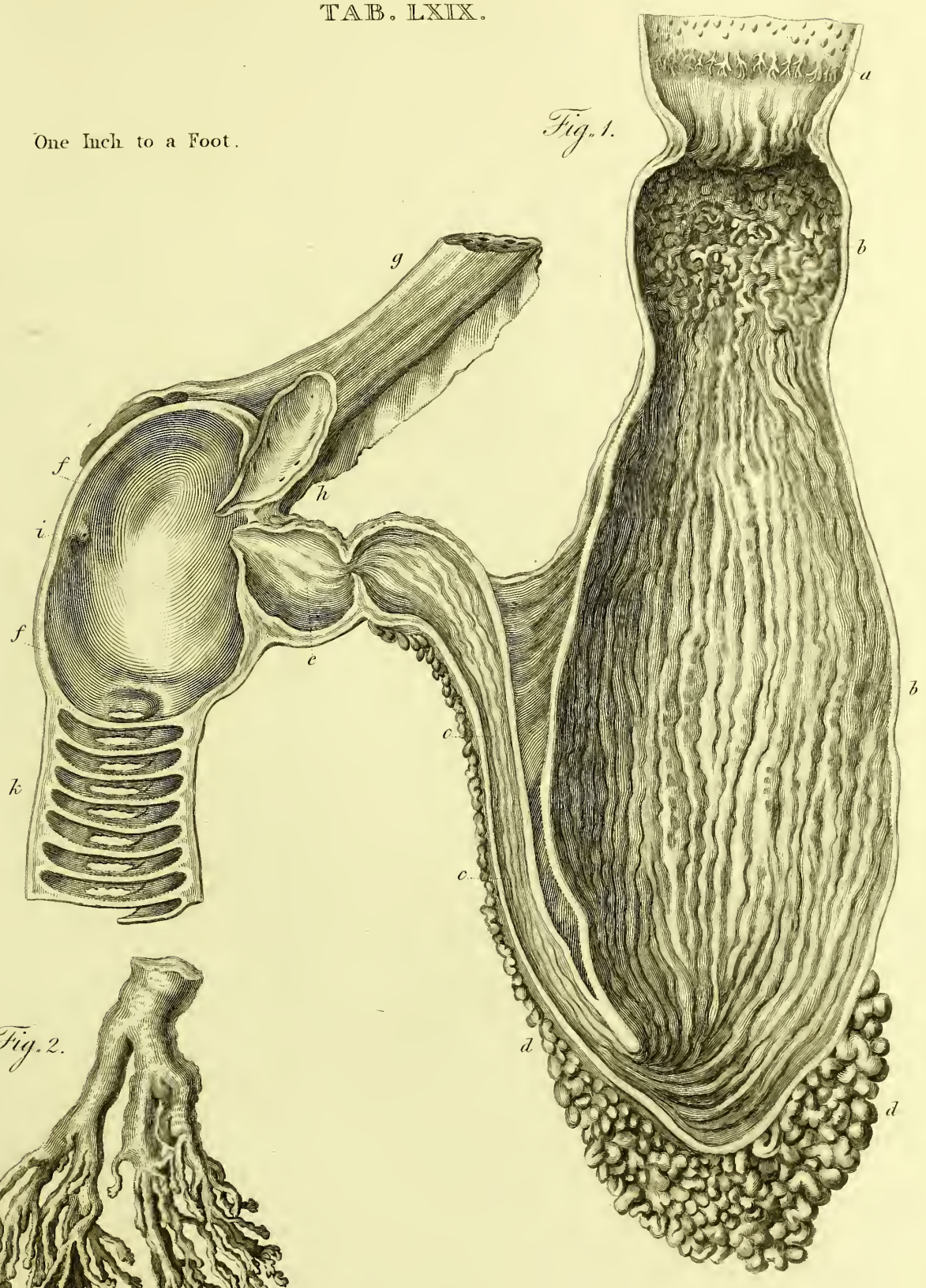
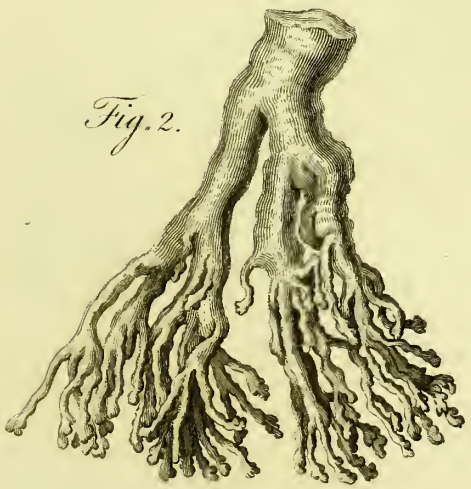


Fig. 2.



T. Howship del.

Fs Basire sc.

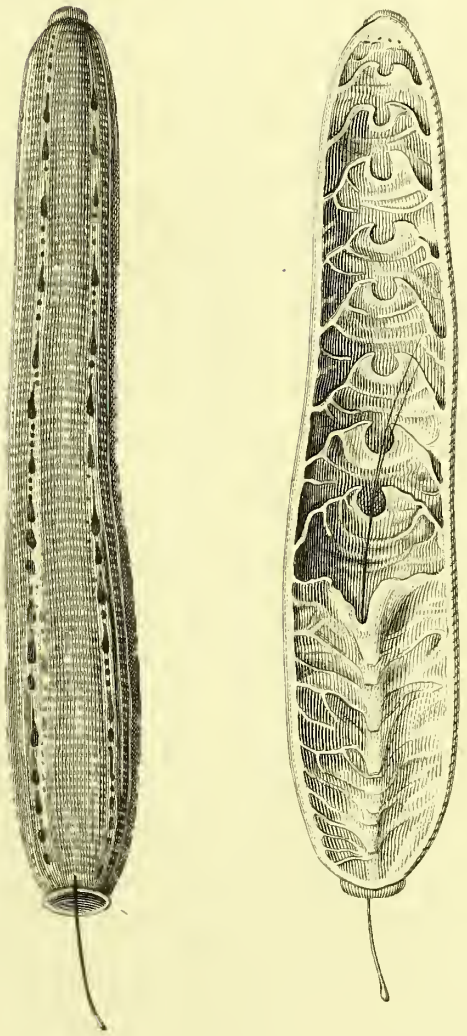
TAB. LXX.

Two views of the leech. Of the natural size.

Fig. 1. A back view of the animal, to shew the termination of the rectum, into which a bristle is introduced.

Fig. 2. A longitudinal section of the stomach. The upper portion, for two-thirds of its length, forms one cavity. There is a longitudinal septum dividing the lower portion into two cœca: in the septum is contained the intestine, which is very small, and marked by a bristle passed through it.

TAB. LXX.



W. Clift del.

J. Basire sc.

TAB. LXXI.

Differant views of the stomach of the dagyza strumosa of Sir Joseph Banks.

Fig. 1. The general shape of the stomach, and of one of the cœca seen through the gelatinous coverings of the animal while alive. The drawing from which this figure is engraved, was made by Mr. Sidney Parkinson, during the voyage made by Sir Joseph Banks, and is of the natural size.

The two following figures of the stomach are magnified more than one-half.

Fig. 2. A. The anus, in which is a bristle.

B B. The intestinal canal.

C C. One of the cœca, with a bristle shewing its course.

D. A glandular substance, the use of which is not known.

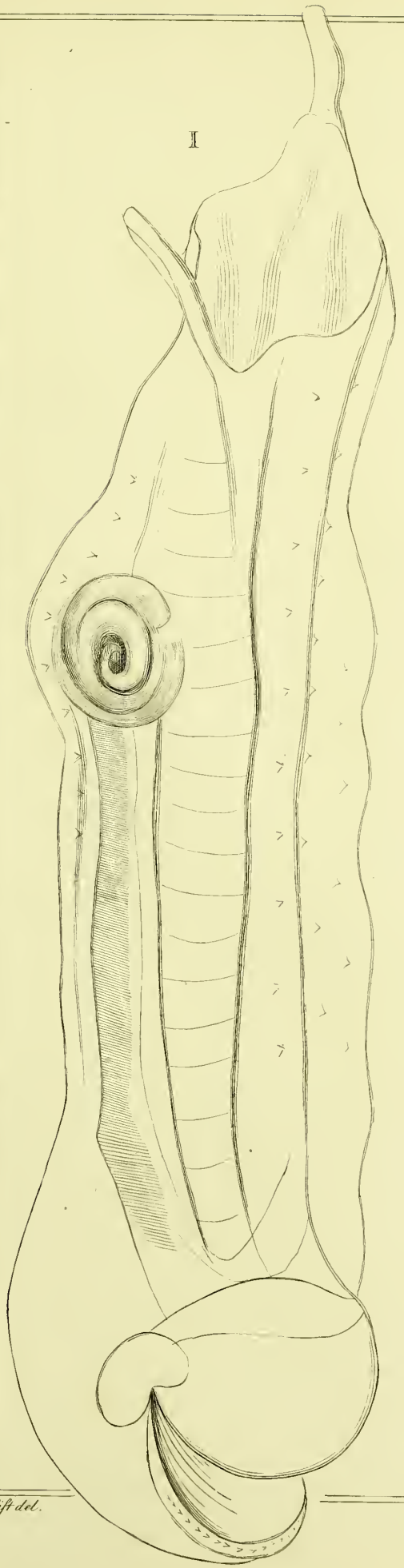
Fig. 3. A. The termination of the œsophagus in the stomach.

B B. The openings into the cœca, which are in part laid open.

G. The anus, from which the intestine may be traced on to the stomach.

TAB. LXXI.

I



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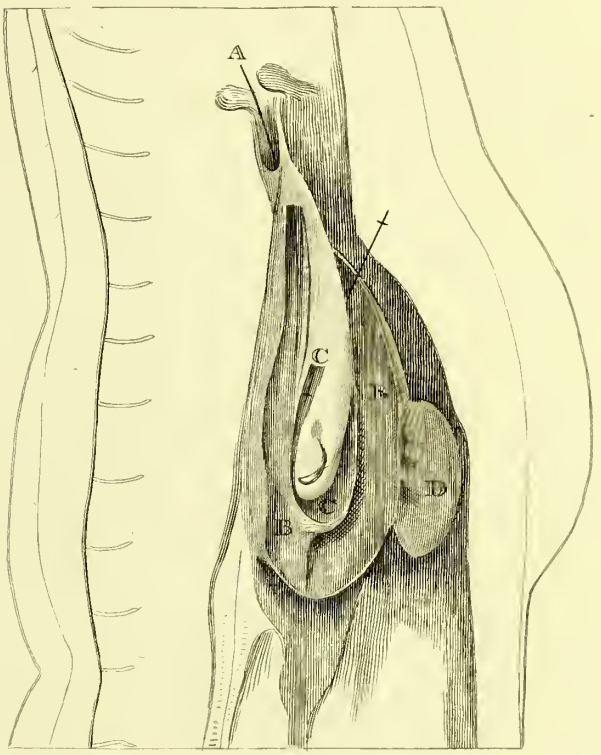

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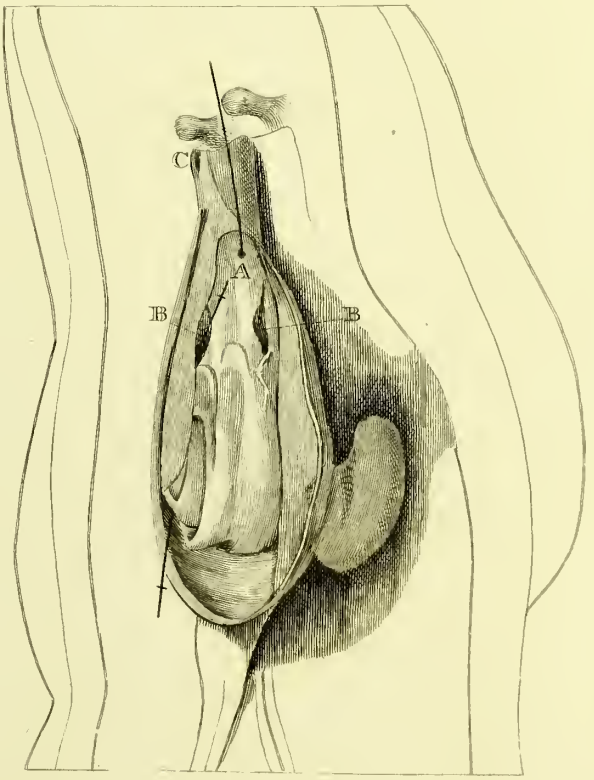


W. Clift del.

J. Basire sc.

TAB. LXXII.

Different views of another species of dagyza.

Fig. 1. The appearance of the stomach and intestine, when one-half of the external and internal covering of the animal is removed.

A. The mouth.

B. The anus.

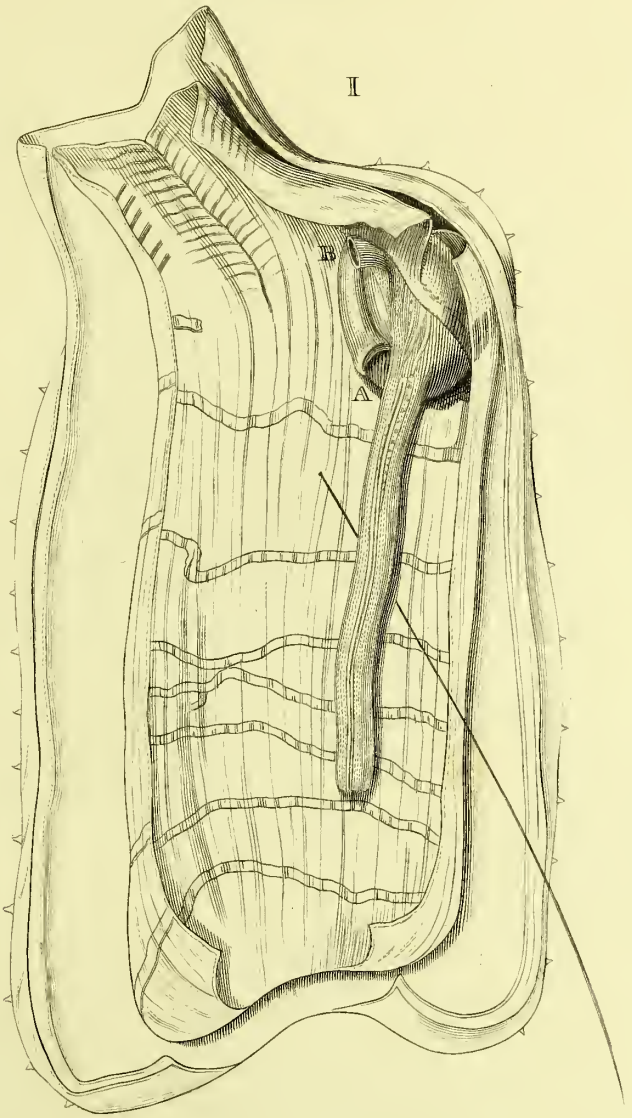
Fig. 2. A lateral view of the stomach, to shew one of the cœca exposed through its whole course.

Fig. 3. A posterior view of the stomach, to shew the mode in which the cœca go off from it.

Fig. 4. Another view of the stomach, to shew the short intestine, which terminates in an opening at the upper part of the figure.

These figures are of the natural size.

TAB. LXXII.



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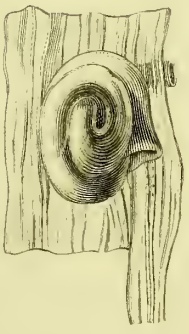


III

IV

W. Clift del.

J. Basire sc.

TAB. LXXIII.

Fig. 1. A portion of a chain of small dagyzæ, of the natural size; and the same portion considerably magnified, to shew the course of the intestine.

A. The mouth.

B. The anus.

Fig. 2. An animal, which I believe to be a species of salpa, to shew the stomach and intestine. The mouth and stomach are very distinctly seen at the lower, and the anus at the upper part of the figure.

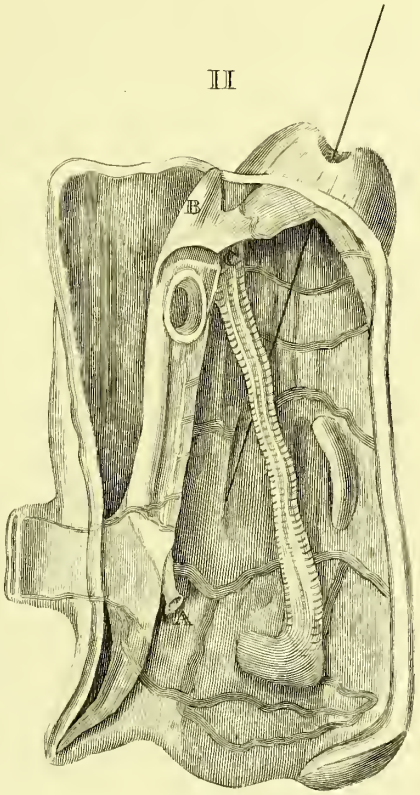
A. The mouth.

B. One of the cœca.

C. The anus.

TAB. LXXIII.

II



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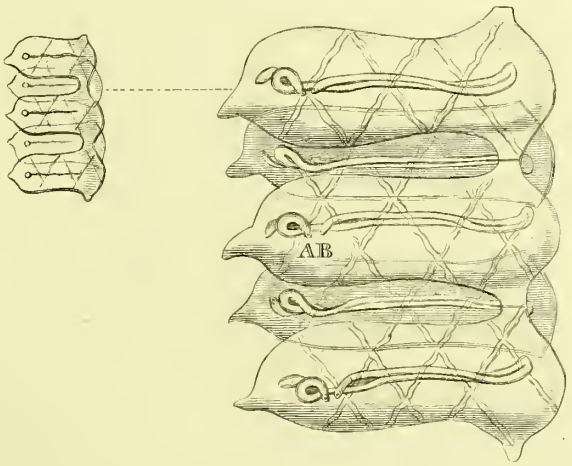


TAB. LXXIV.

Two different species of the animal I have called Ascidia.

The first Species.

Fig. 1. A A. The cut edge of the outer covering.

B B. The second covering which lines the outer, which is ribbed.

C C. The third membrane, which immediately envelopes the viscera.

D. The mouth.

E E. The stomach and intestine.

F. The anus, into which a bristle is introduced, through corresponding orifices in the outer coats.

G. A bristle passed through similar openings in another process, leading to the general cavity of the animal.

H. A small portion of coral rock, to which the animal is attached.

The second Species.

Fig. 2. A. Half of the outer coat turned off.

B. The second membrane, which is ribbed.

C C. Two bristles in orifices which lead from without.

D. The mouth.

E. The stomach.

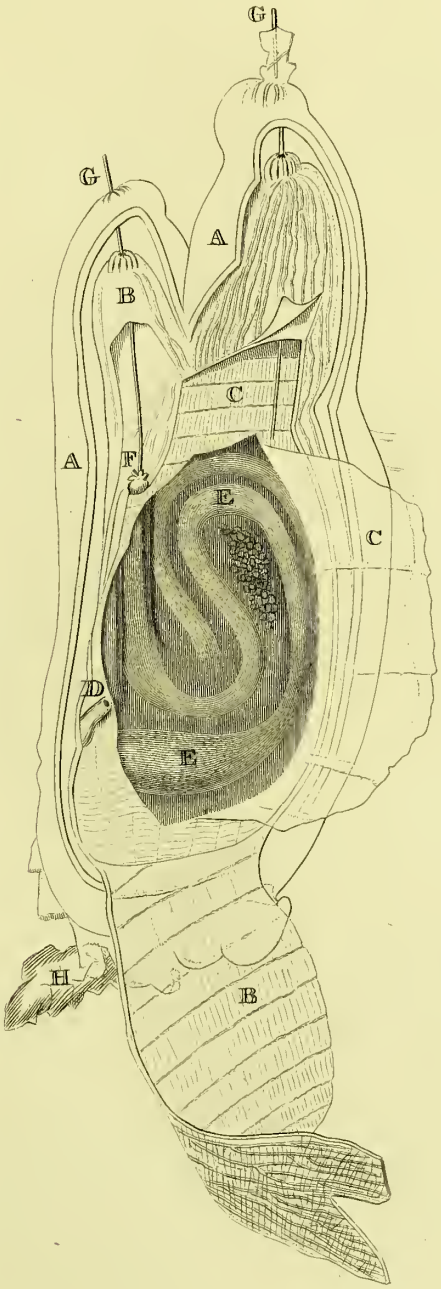
F. The intestine.

G. The anus.

H. The liver.

TAB. LXXIV.

I



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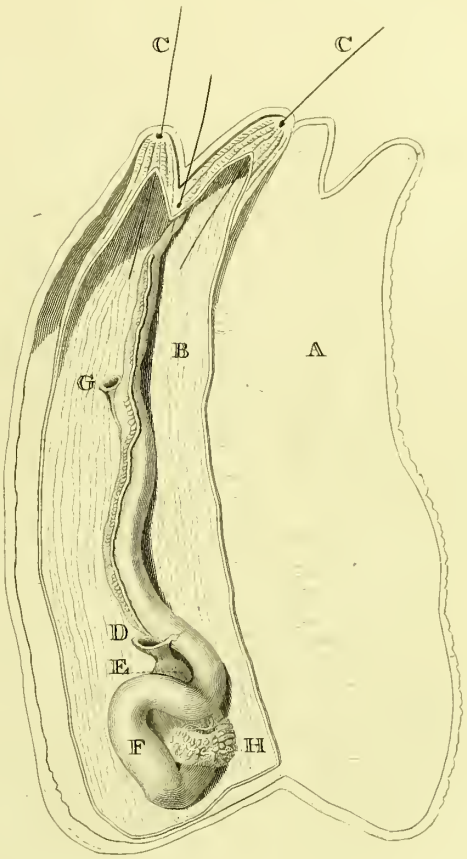


W. Clift del.

T. Bonnor sc.

TAB. LXXV.

The stomach and intestine of two species of barnacle: of the natural size.

Fig. 1. A lateral view of the lepas fascicularis of Ellis; to shew the stomach and course of the intestine.

A. The mouth.

B. The anus, in which is a bristle.

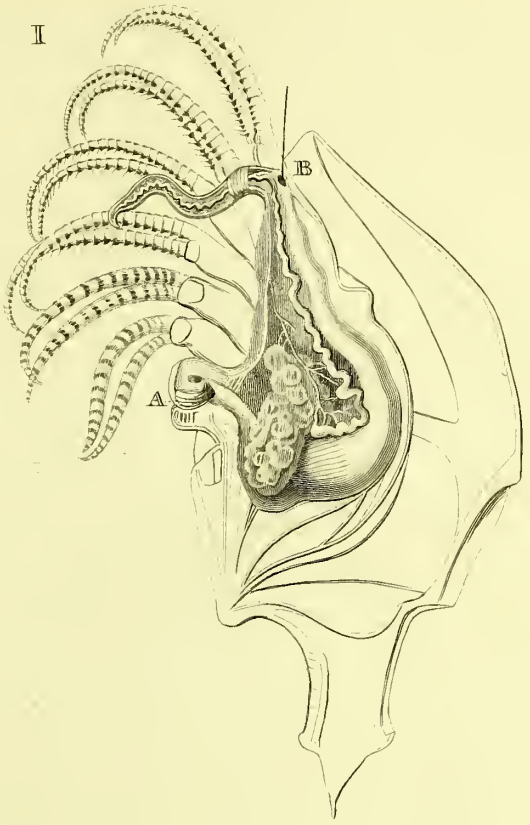
Fig. 2. A similar view of the lepas diadema.

A. The mouth.

B. The anus.

TAB. LXXV.

I



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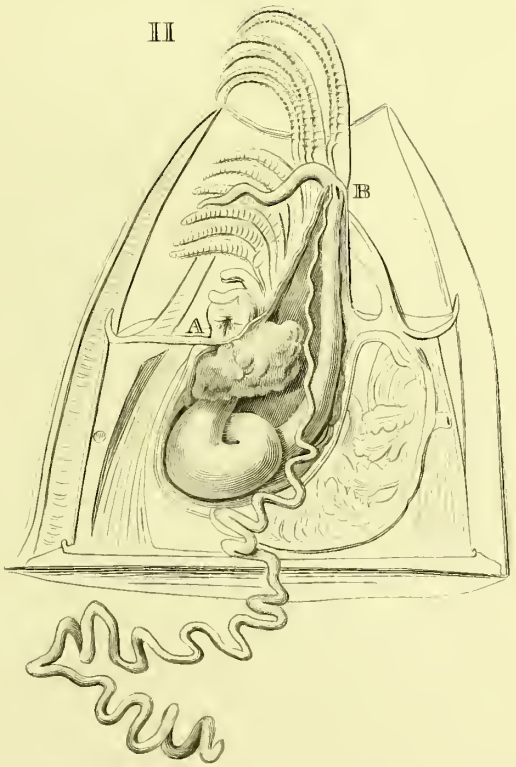

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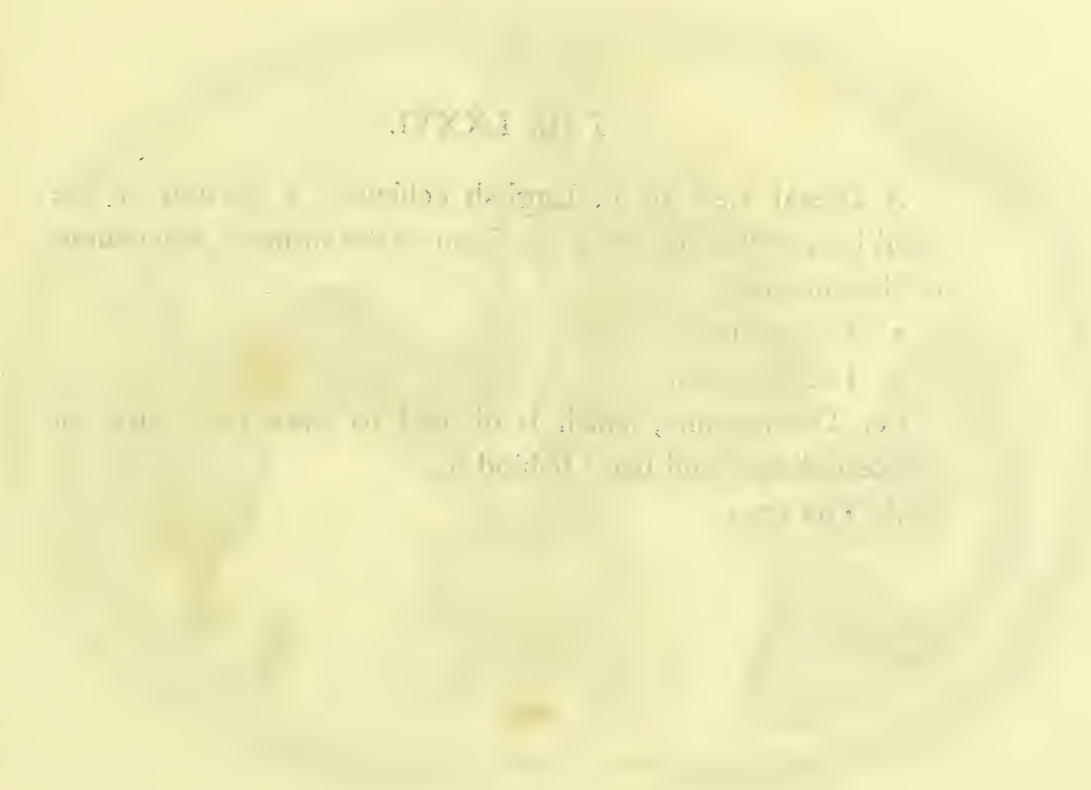
J. Basire sc.



TAB. LXXVI.

A lateral view of an English echinus; a portion of the shell is removed, to shew the form of the stomach and course of the intestine.

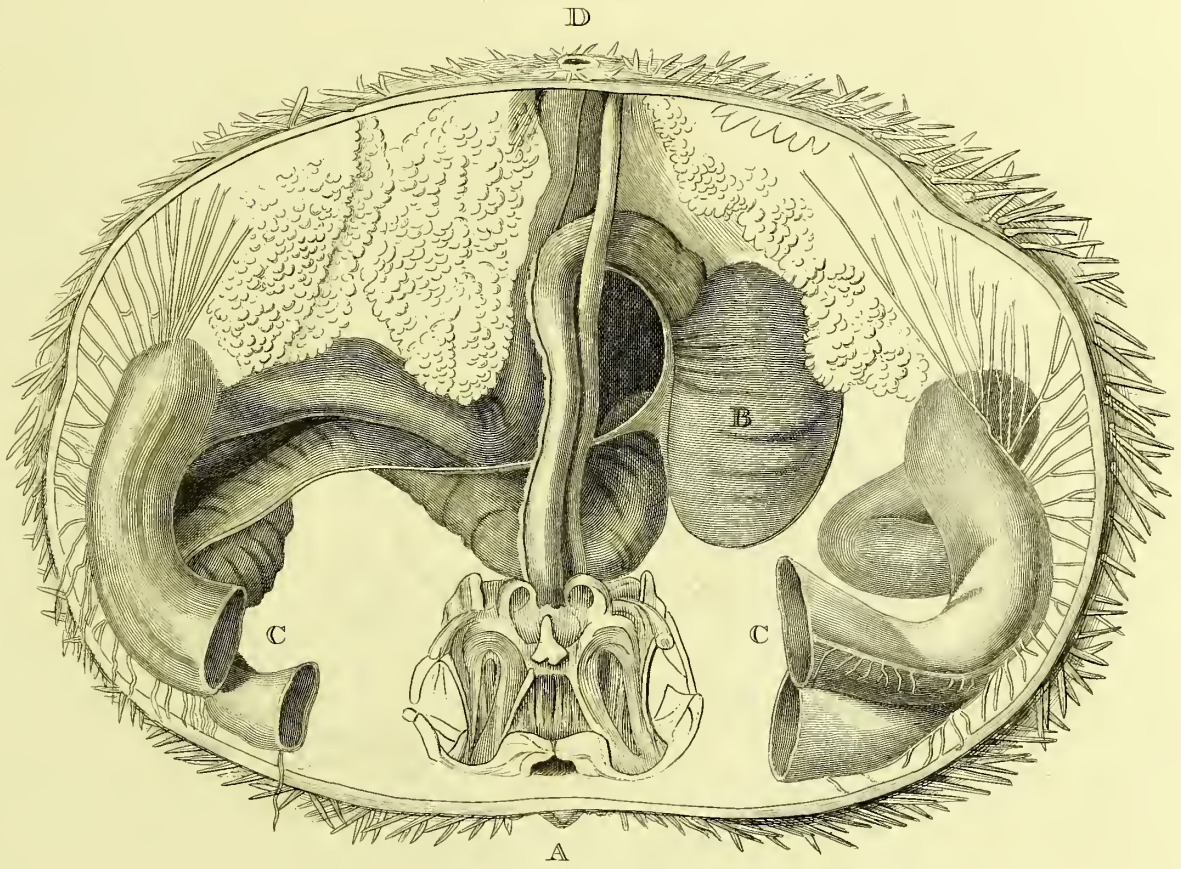
a. The mouth.

b. The stomach.

cc. The intestine, which is divided, to shew the course of the œsophagus and parts behind it.

d. The anus.

TAB. LXXVI.



W. Clift del.

J. Basire sc.

TAB. LXXVII.

An oyster, the flat shell of which is removed to shew the position of the animal with respect to the shell, and the course of its alimentary canal.

A. The mouth.

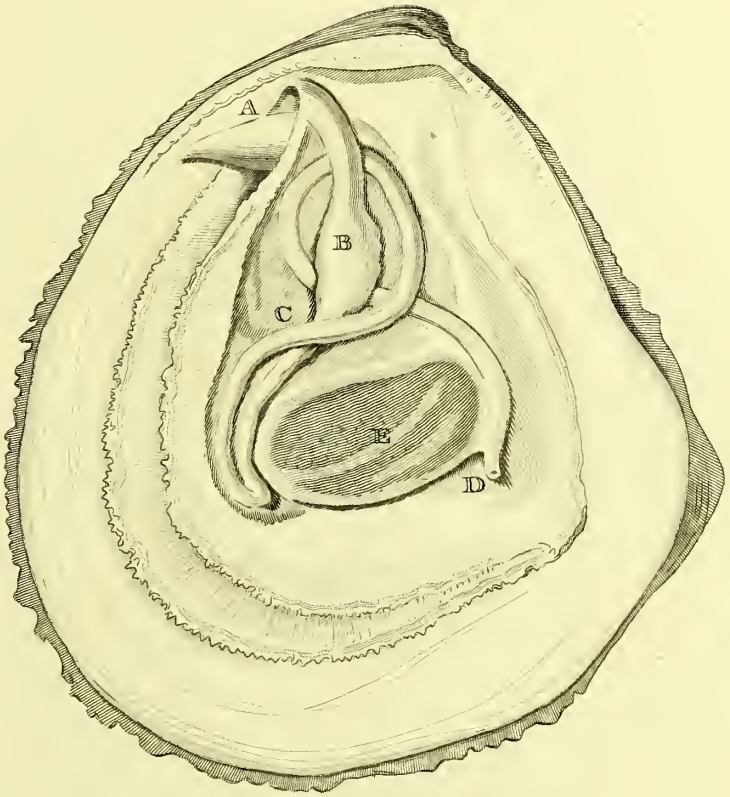
B. The stomach.

C. The intestine.

D. The anus.

E. The muscle which closes the shells.

TAB. LXXVII.



OYSTER.

W. Clift del

J. Basire sc

TAB. LXXVIII.

A lateral view of the great fresh-water muscle; of the natural size; shewing the course of its alimentary canal, in which there is the peculiarity of the rectum passing through the heart.

A. The mouth.

B. The stomach.

C. The intestine passing through the cavity of the ventricle of the heart.

D. The anus.

TAB. LXXVIII.

FRESH WATER MUSCLE.

W. Clift del

J. Basire sculp.

TAB. LXXIX.

The animals from which the figures in this plate were taken, I have mentioned in my Lectures to be species of nereis. I find, however, that some naturalists consider the first to be the aphrodita cirrhosa; and the second, a terebella; there is, however, enough of the external appearance to identify the animal, and correct any error respecting the name.

Fig. 1. The anterior part of the first species, in which the teeth are placed near the beginning of the stomach. Magnified six times.

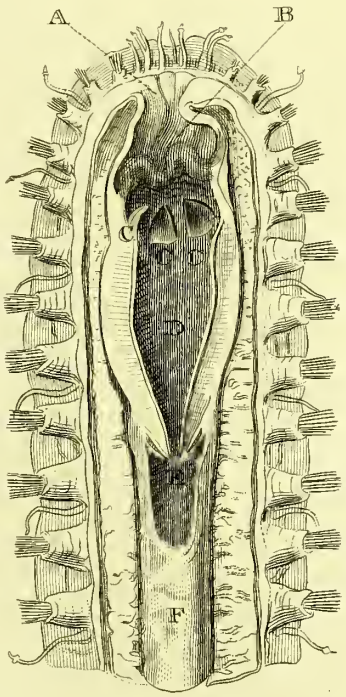
A. The mouth.
B. The œsophagus.
C C C. Two teeth, and a portion of the third.
D. The cavity of the stomach.
E. The pylorus.
F. The intestine.

Fig. 2. The second species, in which the teeth are in the same situation. On a scale of about an inch to half an inch.

A. The mouth.
B. The œsophagus.
CC. Two teeth.
D. The stomach.
E. The pylorus, with a bristle passed into the intestine.
F. The intestine.

TAB. LXXIX.

I



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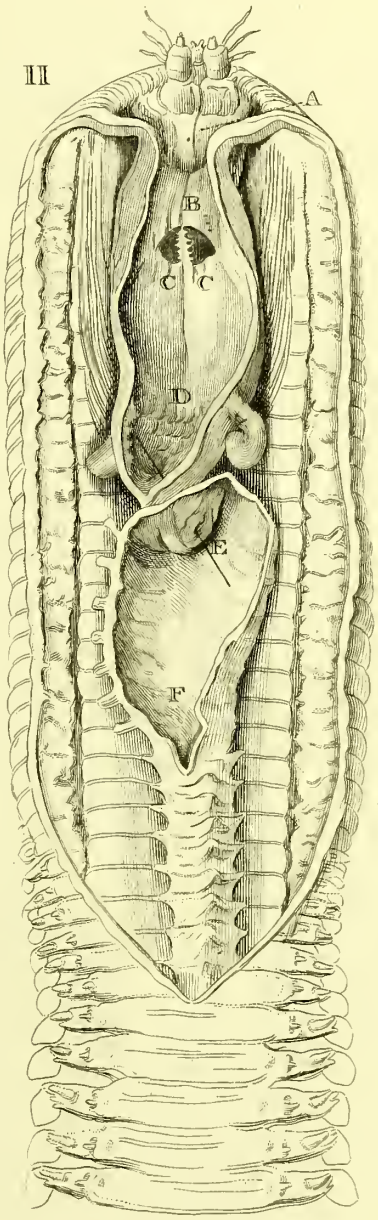


W. Clift del.

J. Basire sc.

TAB. LXXX.

A front, and a lateral view of a large teredo navalis. Of the natural size.

Fig. 1. The animal laid open through its whole extent, exposing the stomach and intestine.

A A. The boring shells.

B B B B. The external covering divided and turned back.

C. The larger tube, which conveys the sea-water into its cavity, in a completely retracted state.

D. The orifice by which the sea water passes out between the boring shells and the proboscis, into the space before the mouth.

E. The œsophagus.

F. Two glands which lie upon it.

G. G. The stomach.

H. The liver.

I I. A portion of one of the testicles.

K. The beginning of the intestine.

L L. The intestine passing down upon the stomach.

M M. The respiratory organs.

N N. The two ovaria between them.

O O. The intestine leading to its termination in the small tube behind the large one.

Fig. 2. Represents the course of the stomach and intestines, removed from the body.

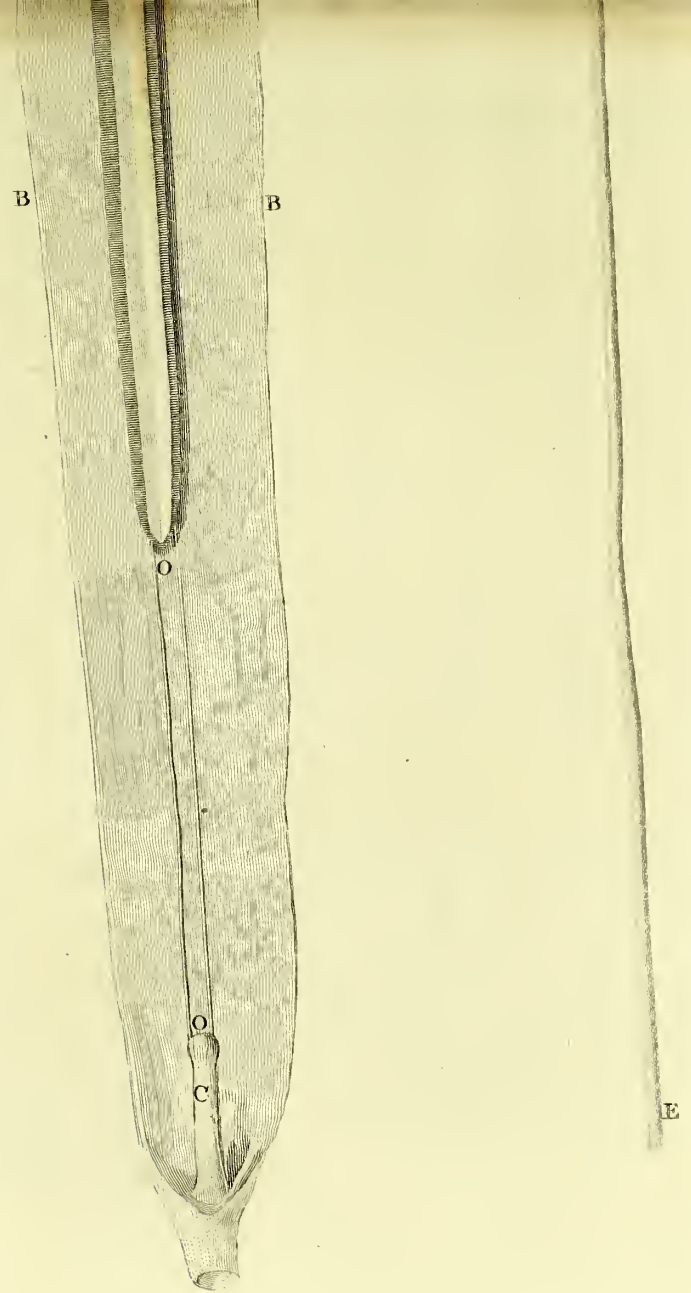
A. The œsophagus.

B. The stomach.

C. The septum dividing it into two cavities.

D. The aperture by which the two cavities of the stomach communicate.

E E E E. The course of the intestine to its termination.


B
B
O
O
C
E

TAB. LXXX.

Fig. 1.

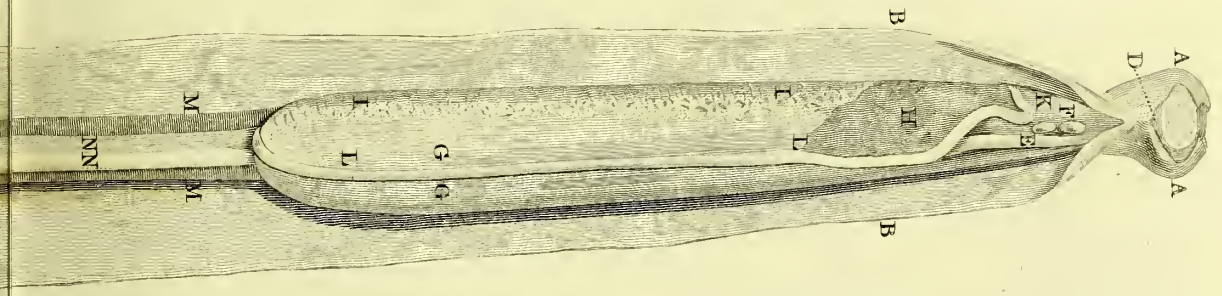
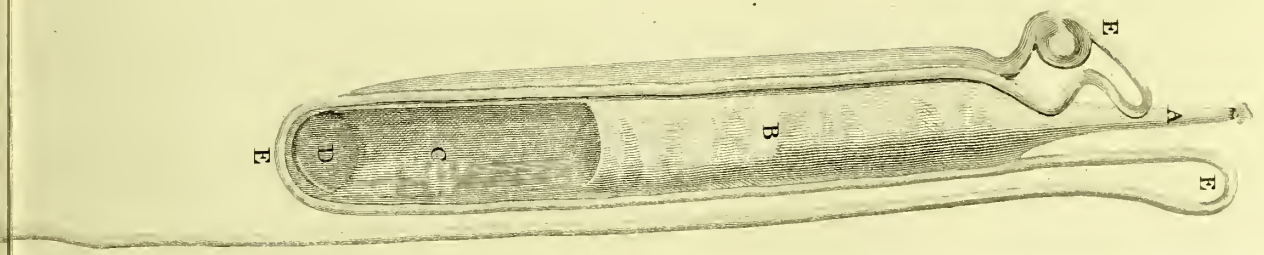


Fig. 2.



TAB. LXXXI.

Different views of the teredo navalis; all of the natural size.

Fig. 1. Represents a portion of an English teredo navalis in its shell, inclosed in the wood; to shew the manner in which the two tubes are protruded, and the appearance of the shell at its termination, which is contracted, but not divided into two canals, as in that of the teredo gigantea.

Fig. 2. Is the teredo figured in Tab. LXXX, before it had been dissected. The opercula are wanting, and the tubes are retracted.

A A. The boring shells.

B. The proboscis.

C. The mouth.

D D. The contents of the abdomen seen through the transparent external covering.

E E. The respiratory organs seen in the same way.

Fig. 3. The English teredo navalis, with the tubes protruded, and the opercula in their natural situation. The letters denote the same parts as in fig. 2. In this figure, the cup containing the opercula and the tubes are distinctly seen.

Fig. 4. Represents the external surface of one of the opercula of the teredo gigantea.

Fig. 5. Shews the other side of the same operculum.

Fig. 6. A side view of the boring shell of the same teredo, with the process that projects from its concave surface, and its cutting edge.

Fig. 7 and 8. The two sides of one of the opercula of the English teredo navalis.

Fig. 9 and 10. Two views of the boring shell of the same teredo.

TAB. LXXXI.

Fig. 1.

Fig. 2.

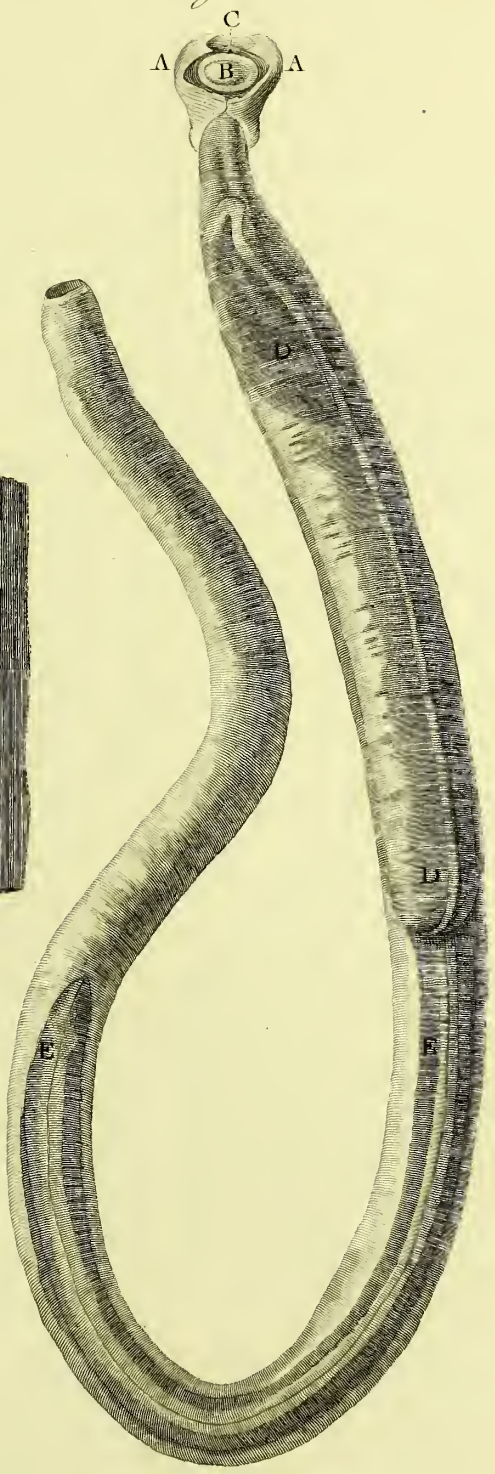


Fig. 3.

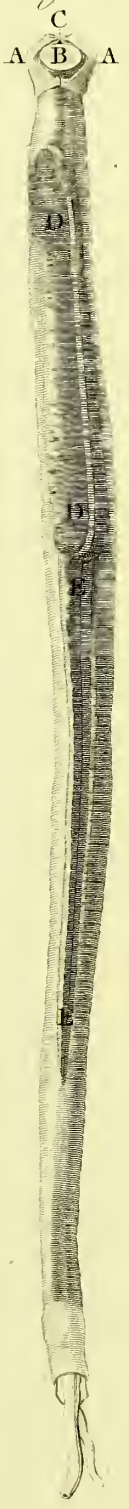


Fig. 4.

Fig. 5

Fig. 6.

7

8

9

10

Wm Clift del.

Bäuerle sc.

TAB. LXXXII.

The animal of the solen or razor shell.

Fig. 2. The body of the animal deprived of the shell.

A. The inclosed part with two openings into it, marked by two bristles.

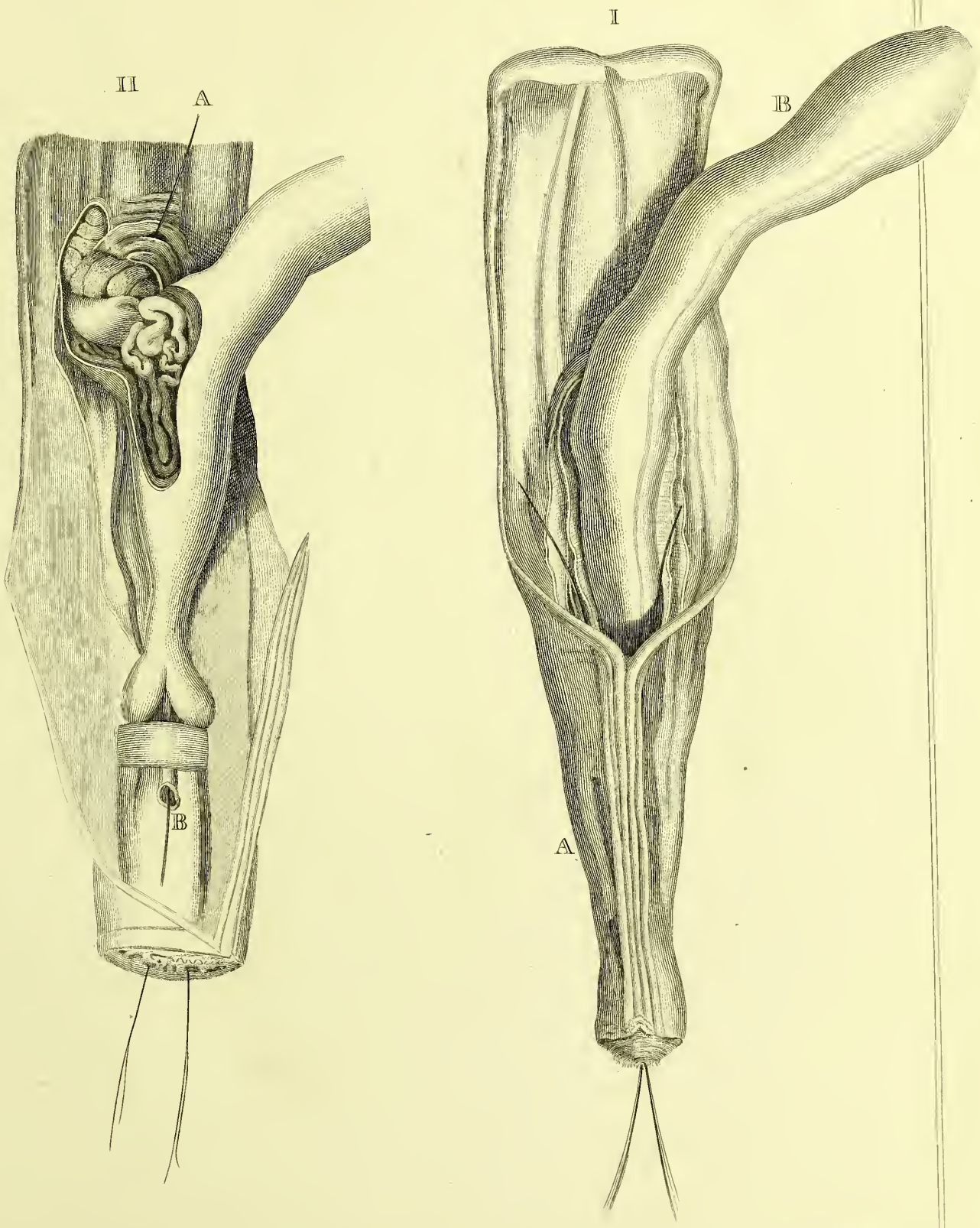
B. The proboscis, partly attached, partly pendulous.

Fig. 2. The viscera exposed in situ, to shew the stomach and intestine.

A. The mouth, into which a bristle is inserted.

B. The anus.

TAB. LXXXII.



W Clift del

J. Basire sc.

TAB. LXXXIII.

The digestive organs of two species of cuttle-fish, the sepia loligo, and sepia octopodia.

Fig. 1. The stomach and intestine of the sepia loligo.

A. The œsophagus.

B. The cavity of the stomach.

C. A bristle placed in the opening leading into an enlargement at the beginning of the duodenum.

D. The spiral appendage.

E. The intestine.

F. The ink-bag, which opens into the intestine near the anus.

G. The anus.

Fig. 2. The stomach and intestine of the sepia octopodia.

A. The mouth.

B. The gizzard.

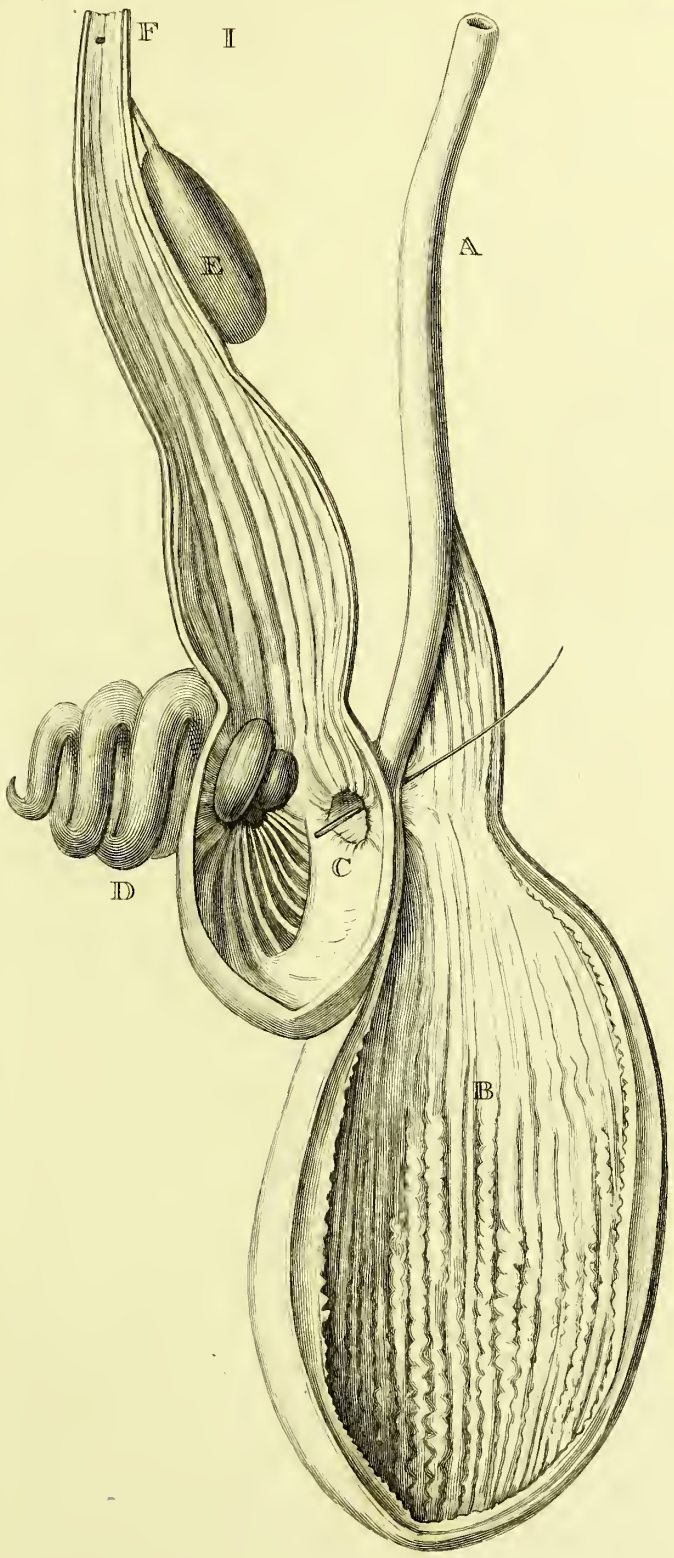
C. The spiral appendage.

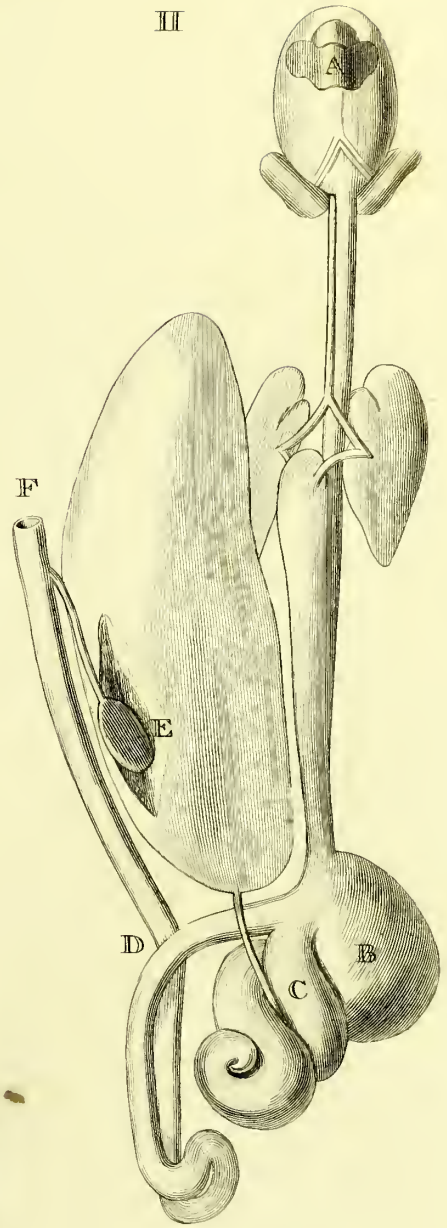
D. The intestine.

E. The ink-bag.

F. The anus.

TAB. LXXXIII.





W. Clift del.

J. Basire sc.

TAB. LXXXIV.

The digestive organs of the Cape grass-hopper; and of the queen, and labouring termites, or white ant of Africa.

Fig. 1. The œsophagus, stomach and intestine of the Cape grass-hopper, very considerably magnified.

A. The œsophagus, in which are placed five rows of teeth.

B. The stomach.

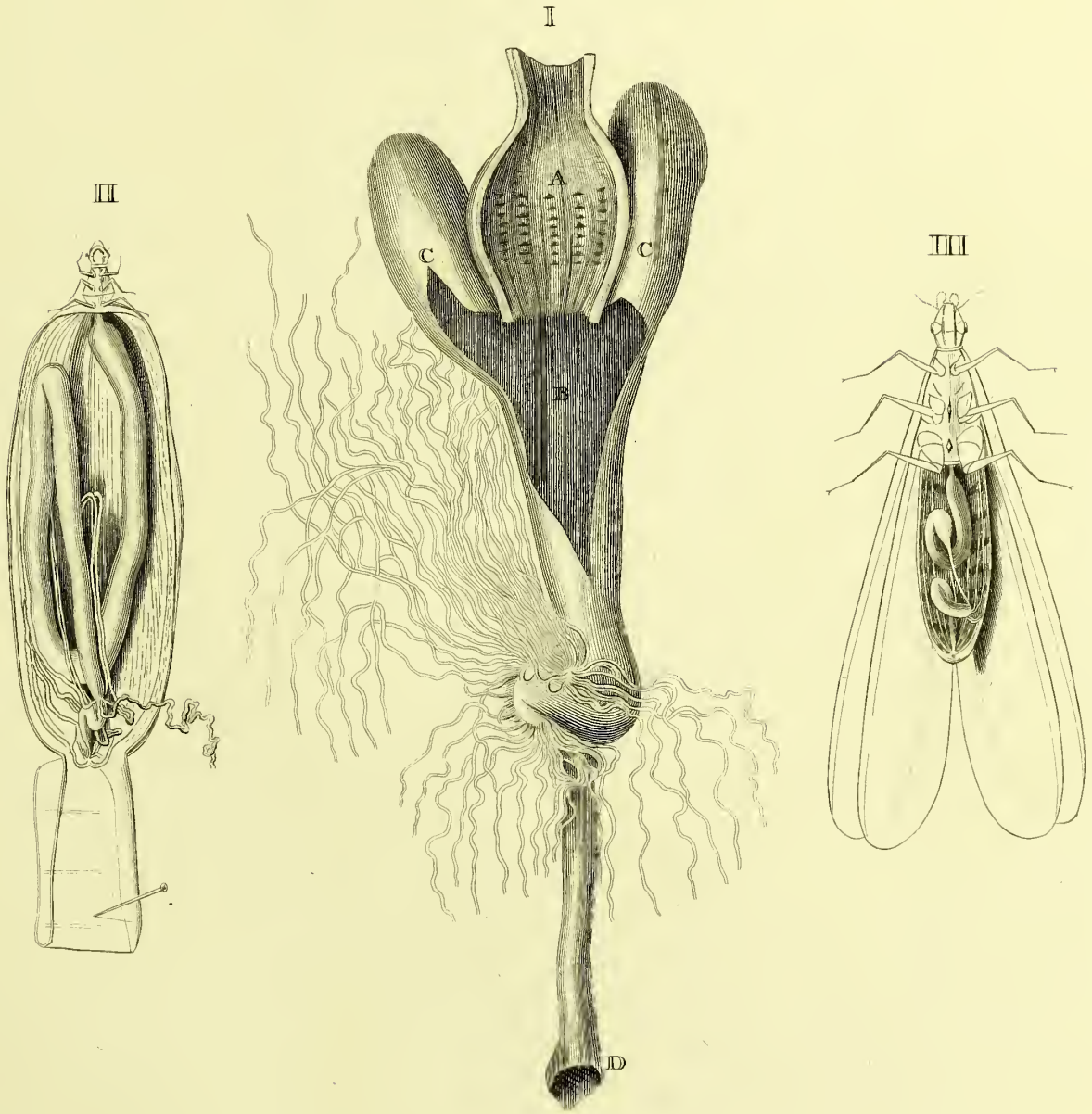
C C. The cœca.

D. The anus.

Fig. 2. The queen of the termites, shewing the course of the stomach; at the lower end there is a part which may be called intestine.

Fig. 3. One of the labouring termites become perfect, or in the fly-state, very much magnified, in which there is a marked difference between the stomach and intestine.

TAB. LXXXIV.



W. Clift del.

T. Bonner sc.

The following fourteen engravings exhibit the alimentary canal of fishes, in which the form of the stomach and the course of the intestines are represented. The name of each specimen is introduced on the plate, except Tab. XCVIII. which is the squalus acanthias of Linnæus.

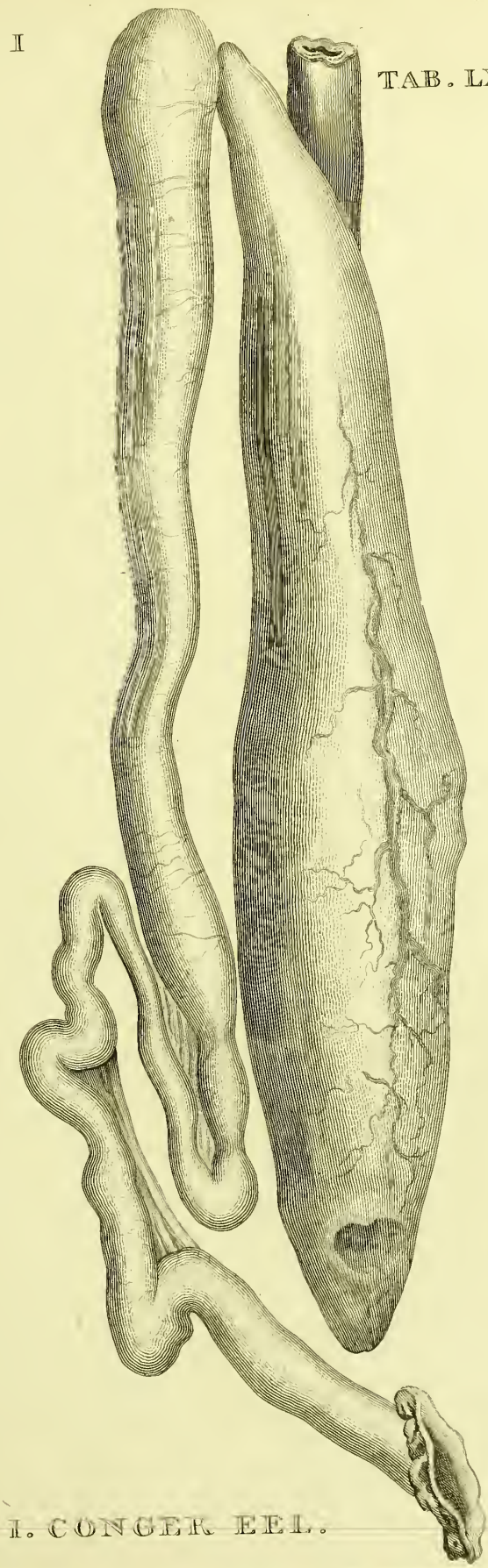
TAB. LXXXV.

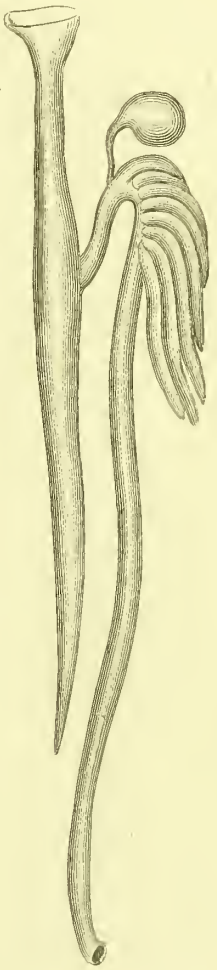
The first of this set of engravings of which no particular description is required.

I

TAB. LXXXV.

II





I. CONGER EEL.

II. PILCHARD.

W. Clift del.

J. Basire sculp.

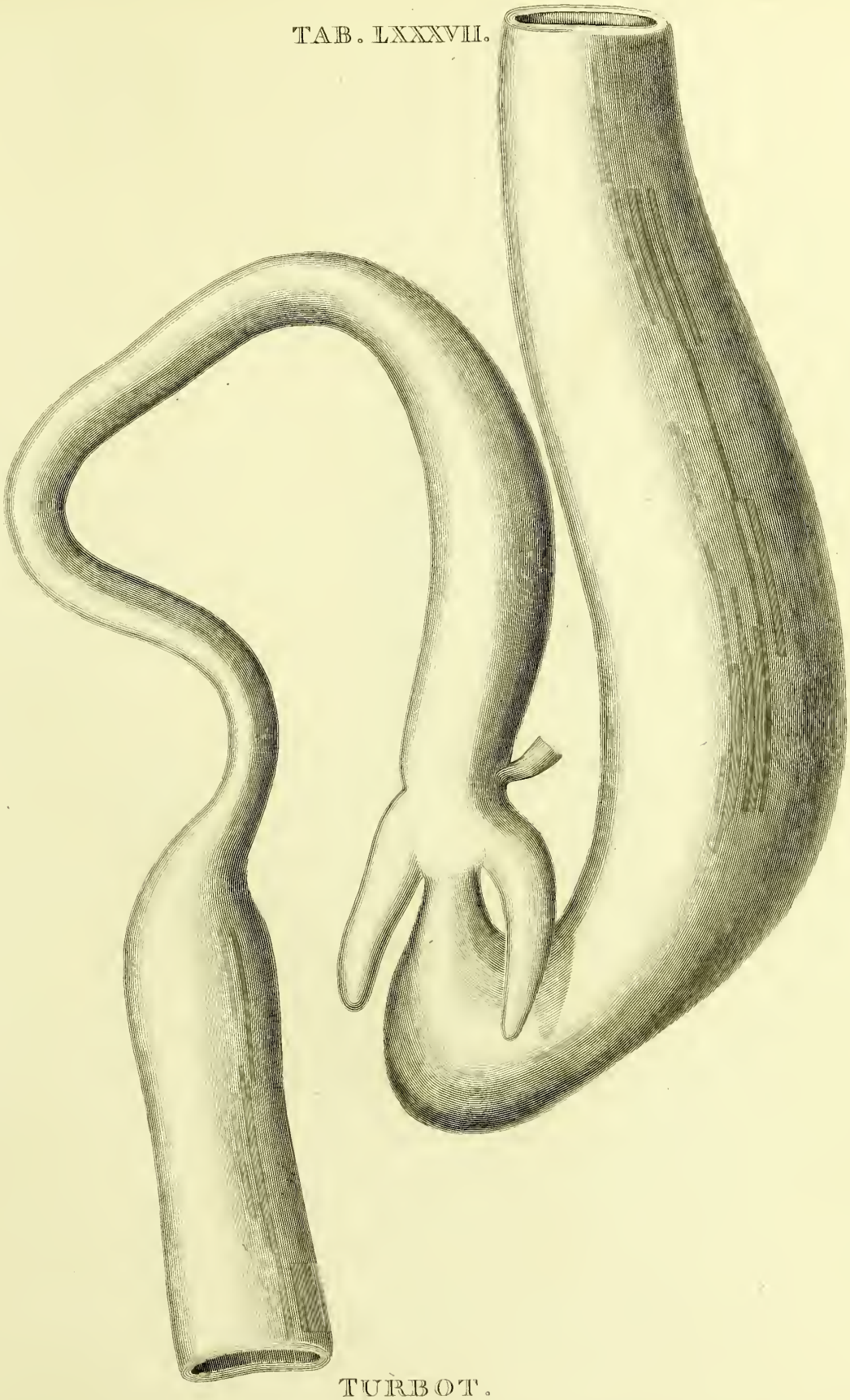
TAB. LXXXVI.

PIKE.

W. Clift del.

T. Bauro sc

TAB. LXXXVII.

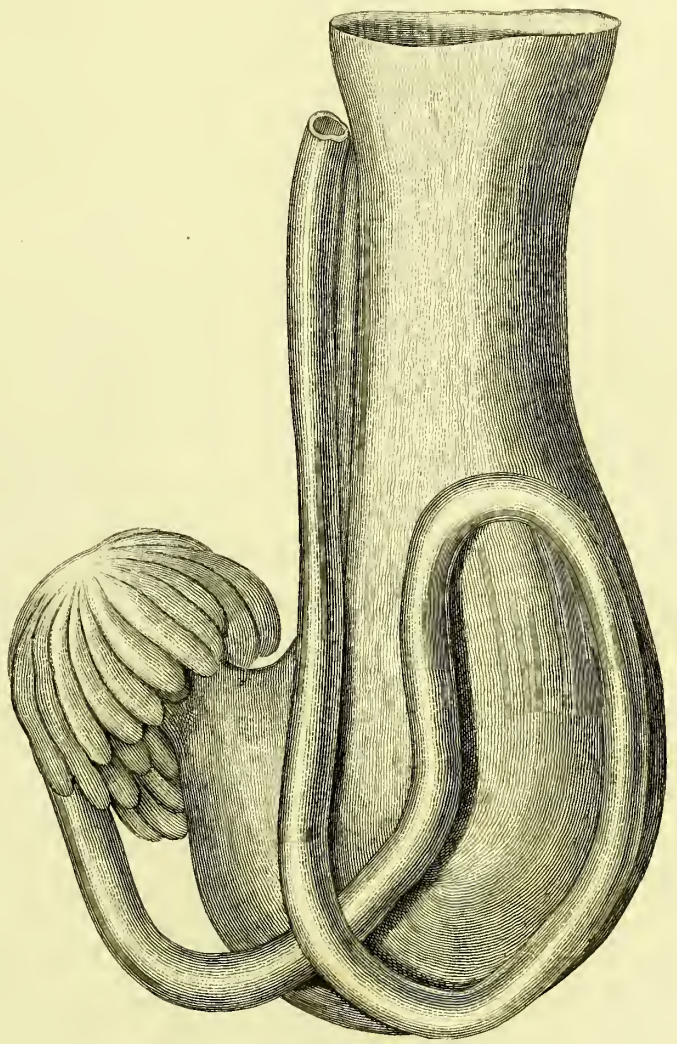


TURBOT.

W. Clift del.

J. Basire sculp.

TAB. LXXXVIII.

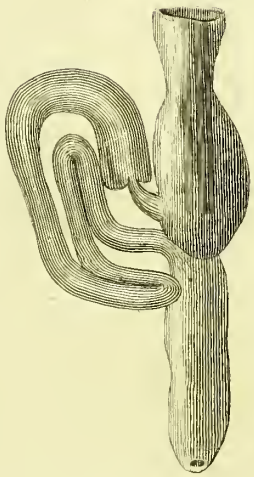


ELECTRICAL EEL.

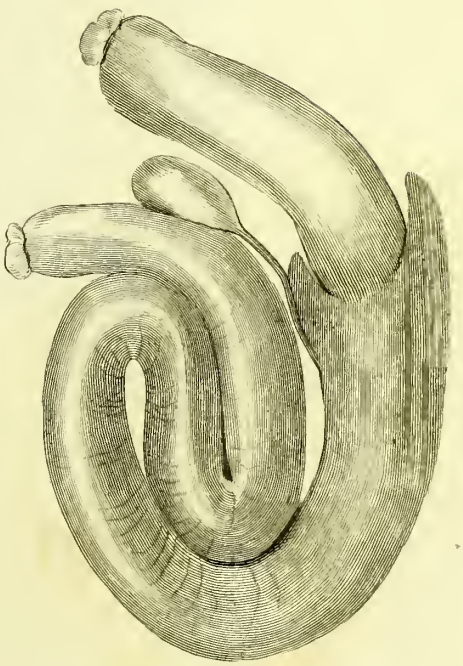
W. Clift del. J. Basire sculp.

TAB. LXXXIX.

I



II



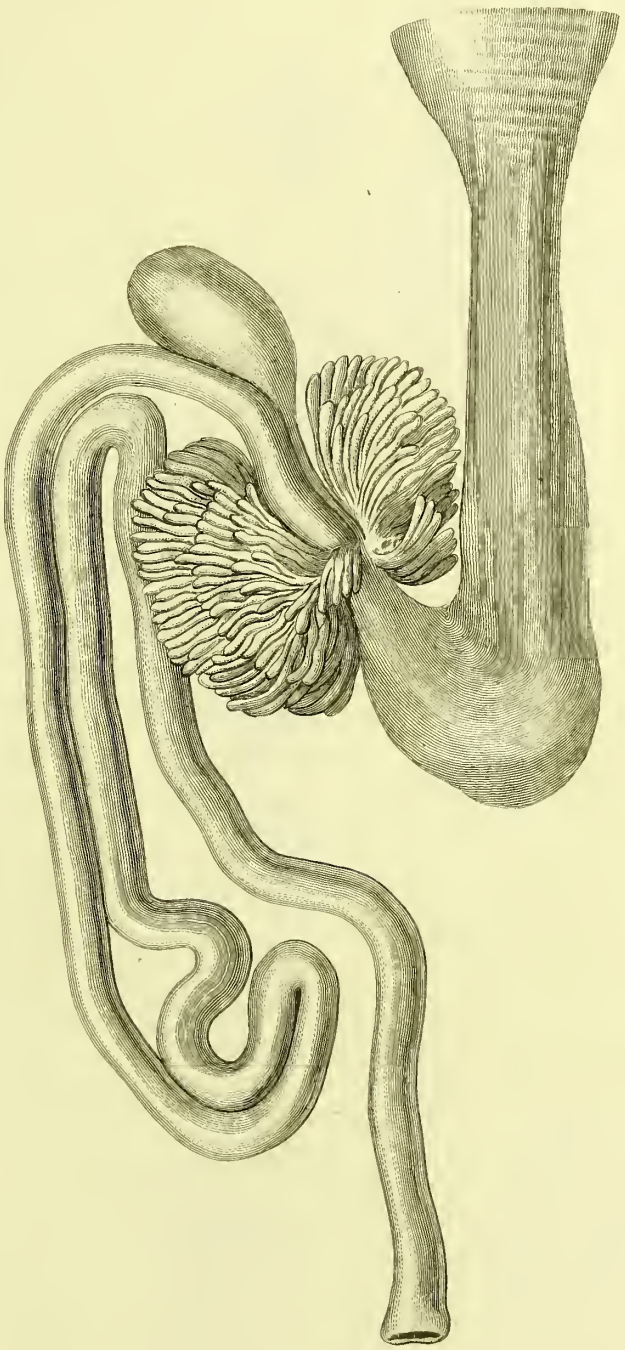
I. TOAD-FISH.

II. FLOUNDER.

W. Clift del.

T. Bastres sc.

TAB. XC.

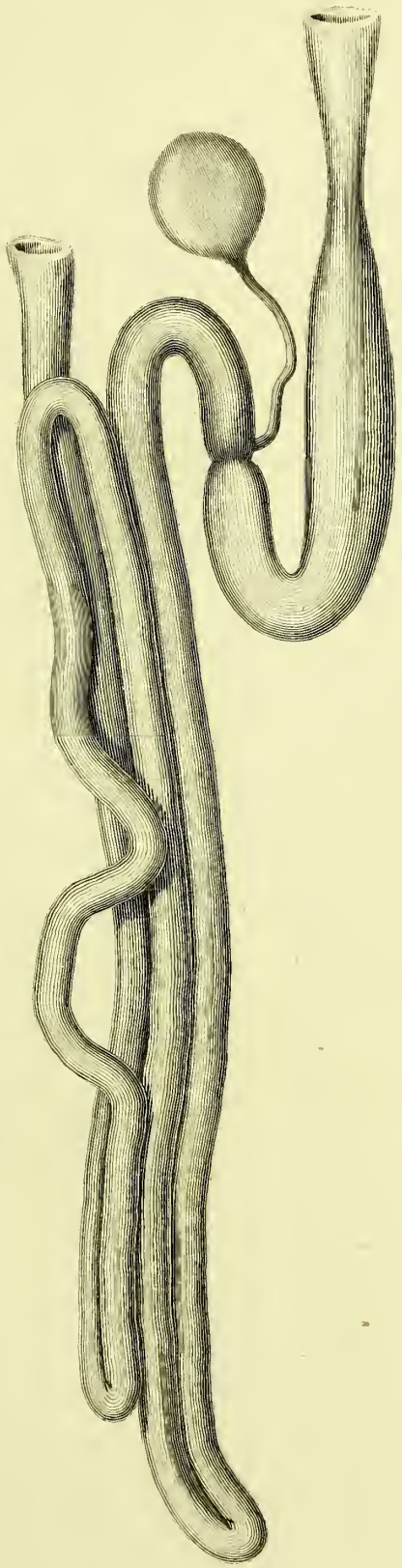


HADDOCK.

W. Clift del.

J. Basire sc.

TAB. XCI.

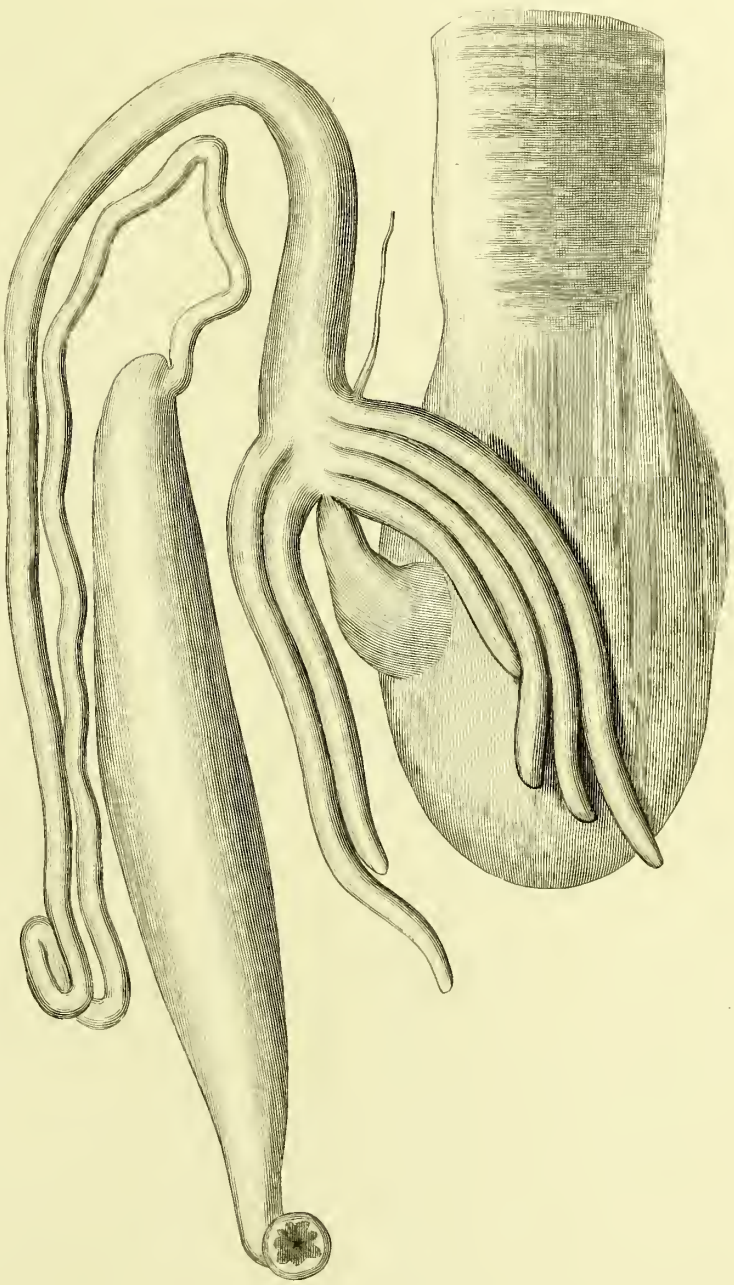


SOLE.

W. Clift del.

T. Barre sculp.

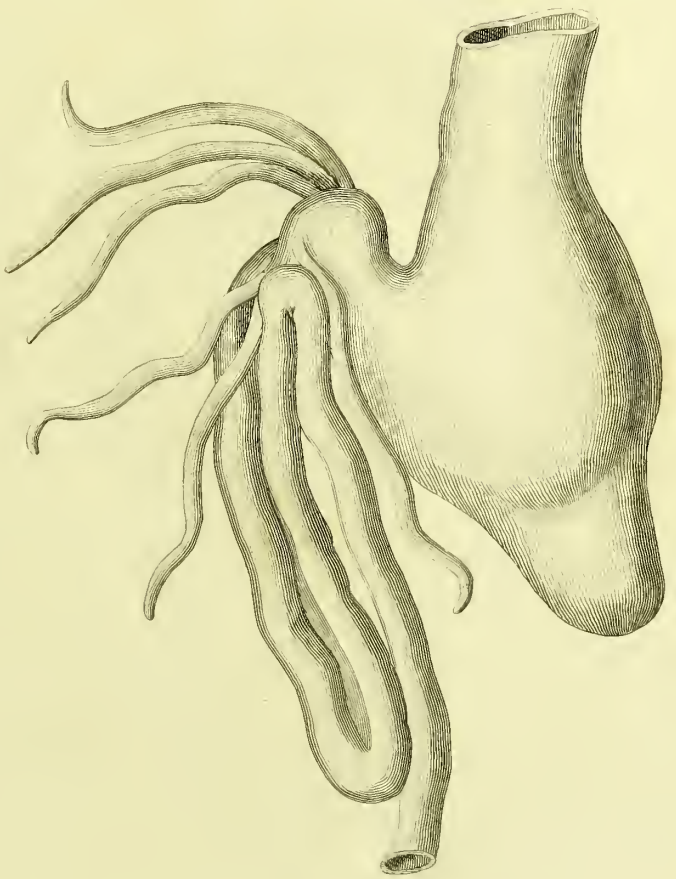
TAB. XCII.



SCORPÆNA HORRIDA.

W. Clift del. J. Basire sculp.

TAB. XCIII.

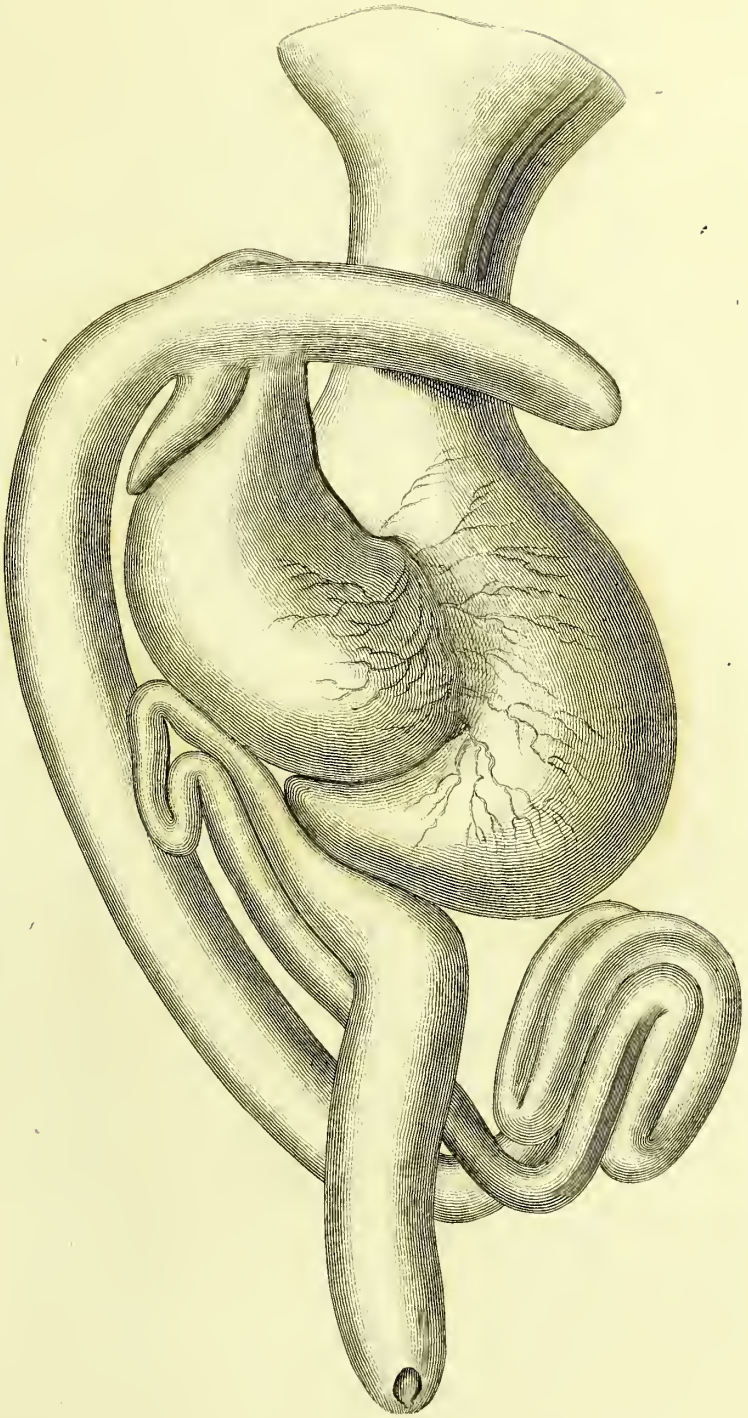


GURNARD.

W. Clift del.

J. Basire sculp.

TAB. XCIV.

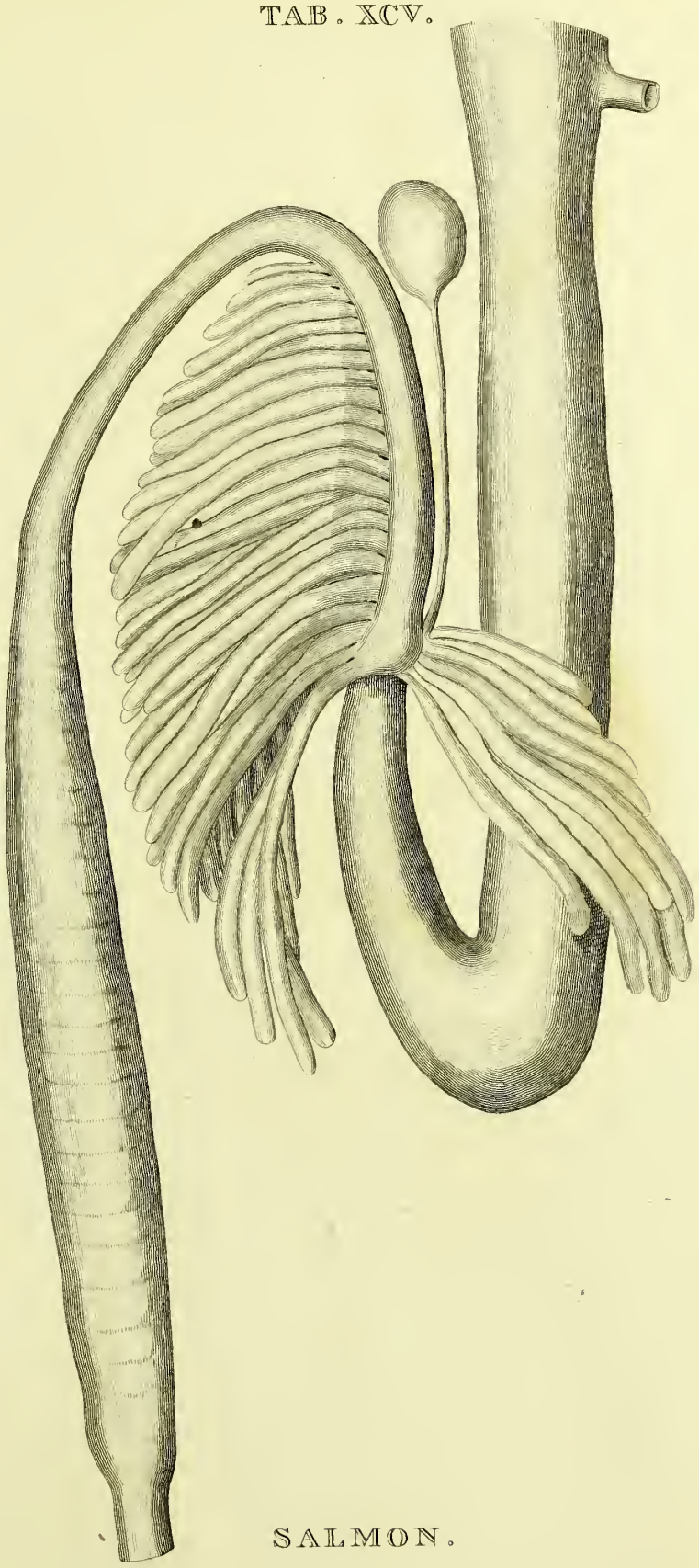


LOPHIUS PISCATORIUS.

W. Clift del.

J. Basire sculp.

TAB. XCV.

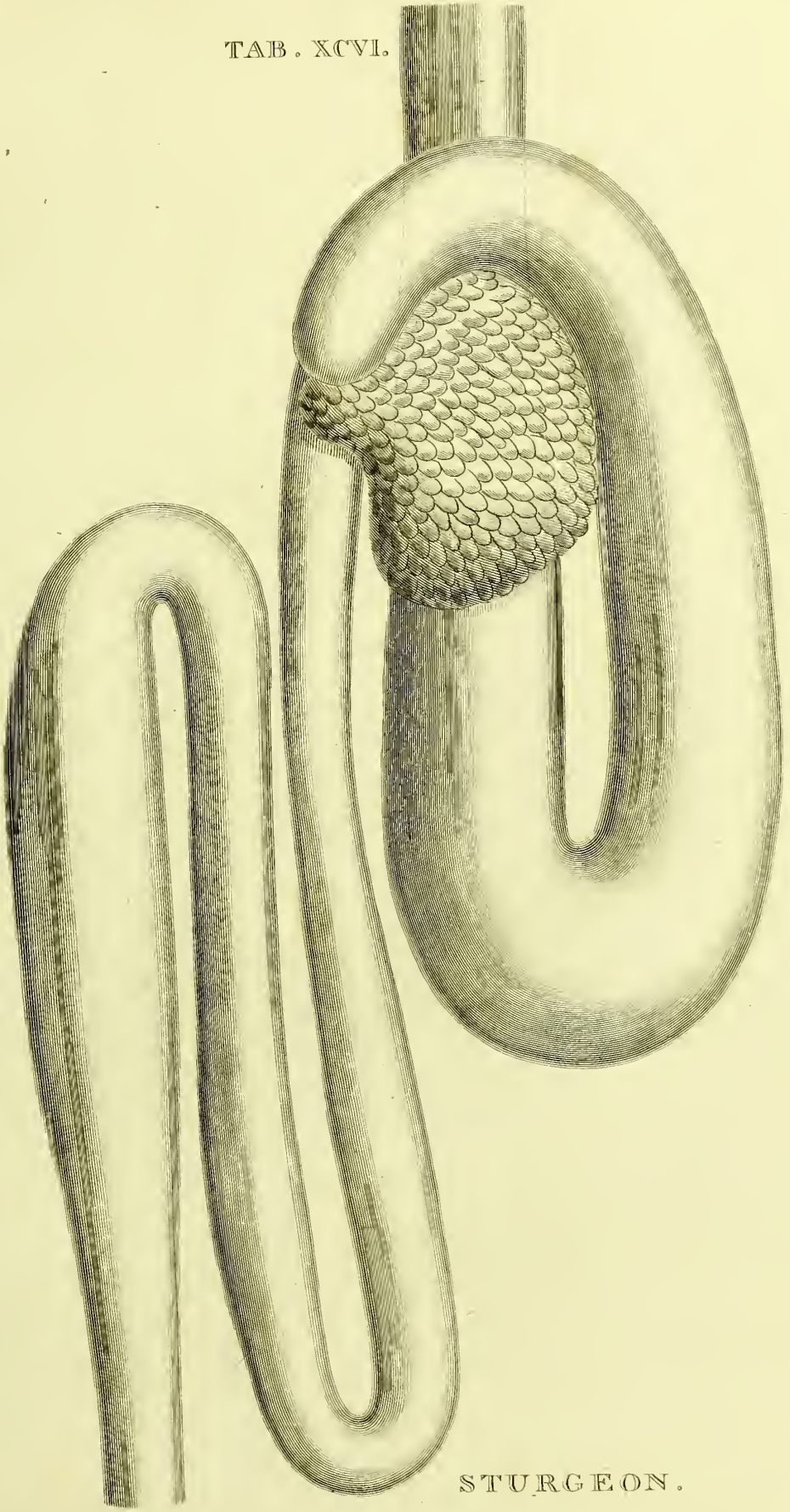


SALMON.

W. Clift del.

J. Basire sculp.

TAB. XCVI.

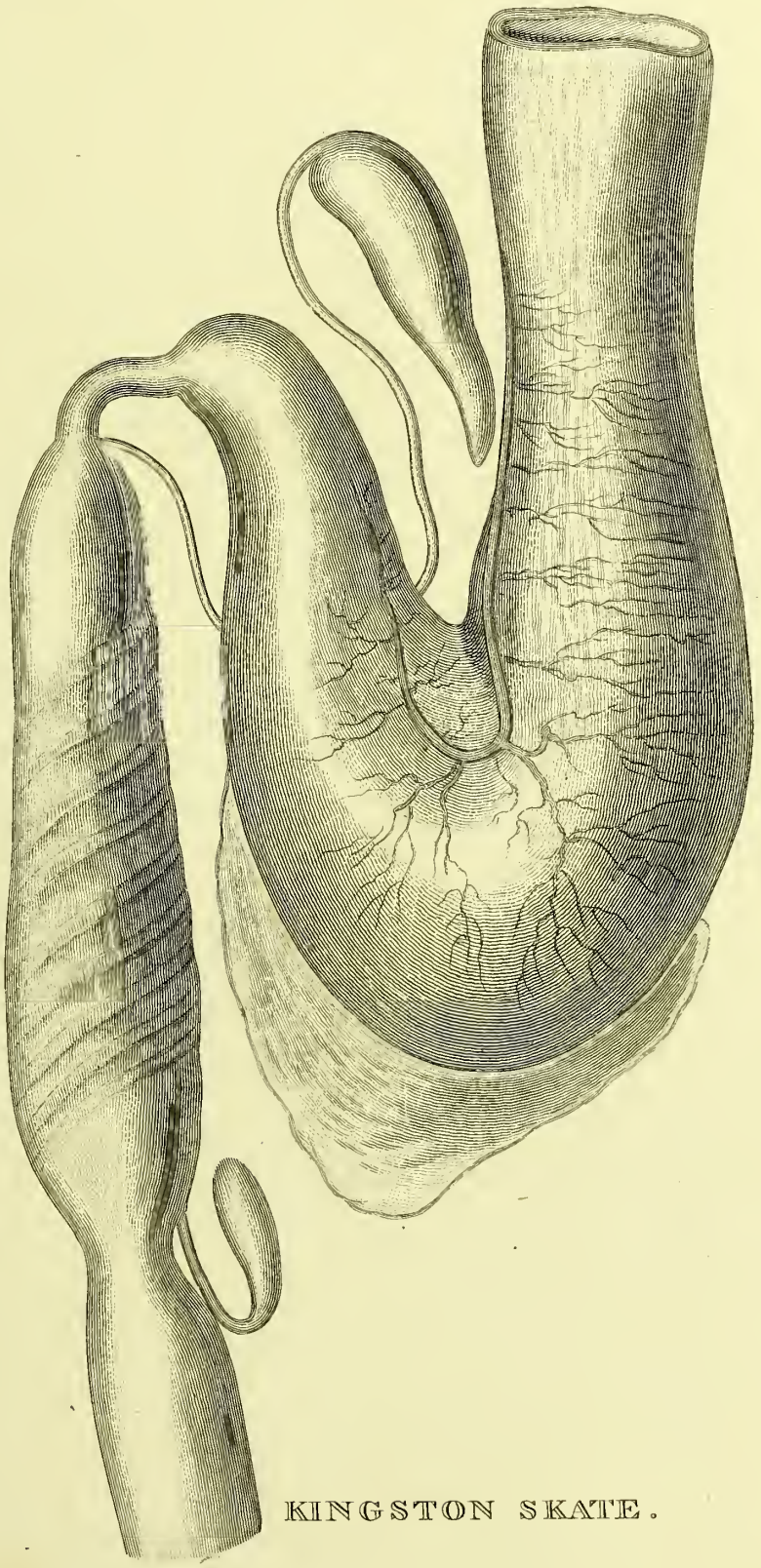


STURGEON.

W. Clift del.

J. Basire sculp

TAB. XCVII.



KINGSTON SKATE.

W^m Clift del.

J. Basire sc.^p

TAB. XCVIII.

An internal view of the belly of the oviviviparous dog-fish, squalus acanthias of Linnæus, to shew the appearance of the stomach and intestine in situ, and their relative situation to the other viscera. Of the natural size.

a. The heart.

b b. The liver. The left lobe is cut away to expose the parts behind.

c. The œsophagus.

d. The cardiac portion of the stomach.

e. The pyloric portion.

f. The small cavity between the pylorus and duodenum.

g. The duodenum.

h h. The valvular intestine.

i i. An appendix, with which it communicates.

k k. The testicle.

l l. The vas deferens, the lower portion of which is straight, and distended with semen.

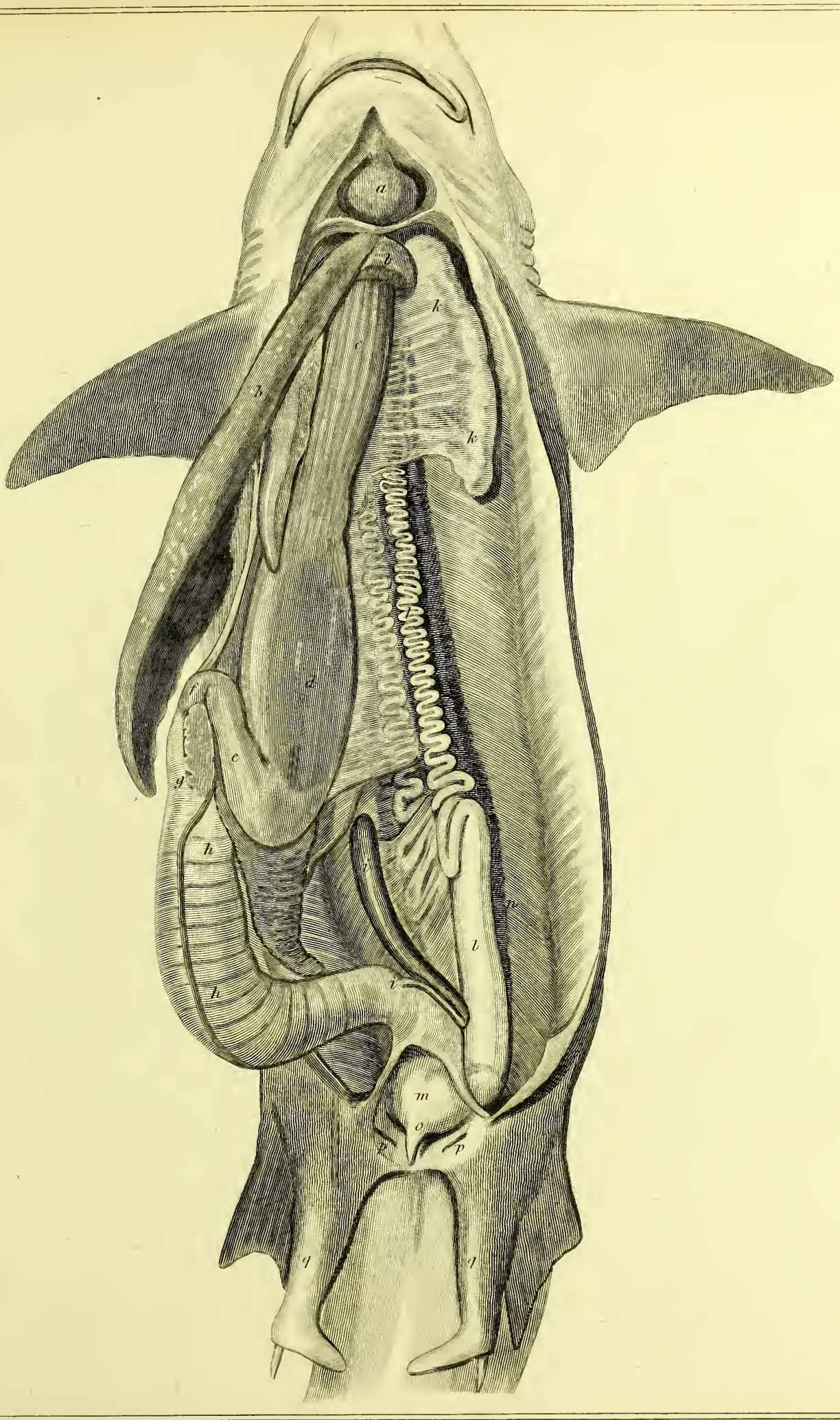
m. The cavity which is the reservoir of semen, and urinary bladder.

n. The kidney.

o. The penis.

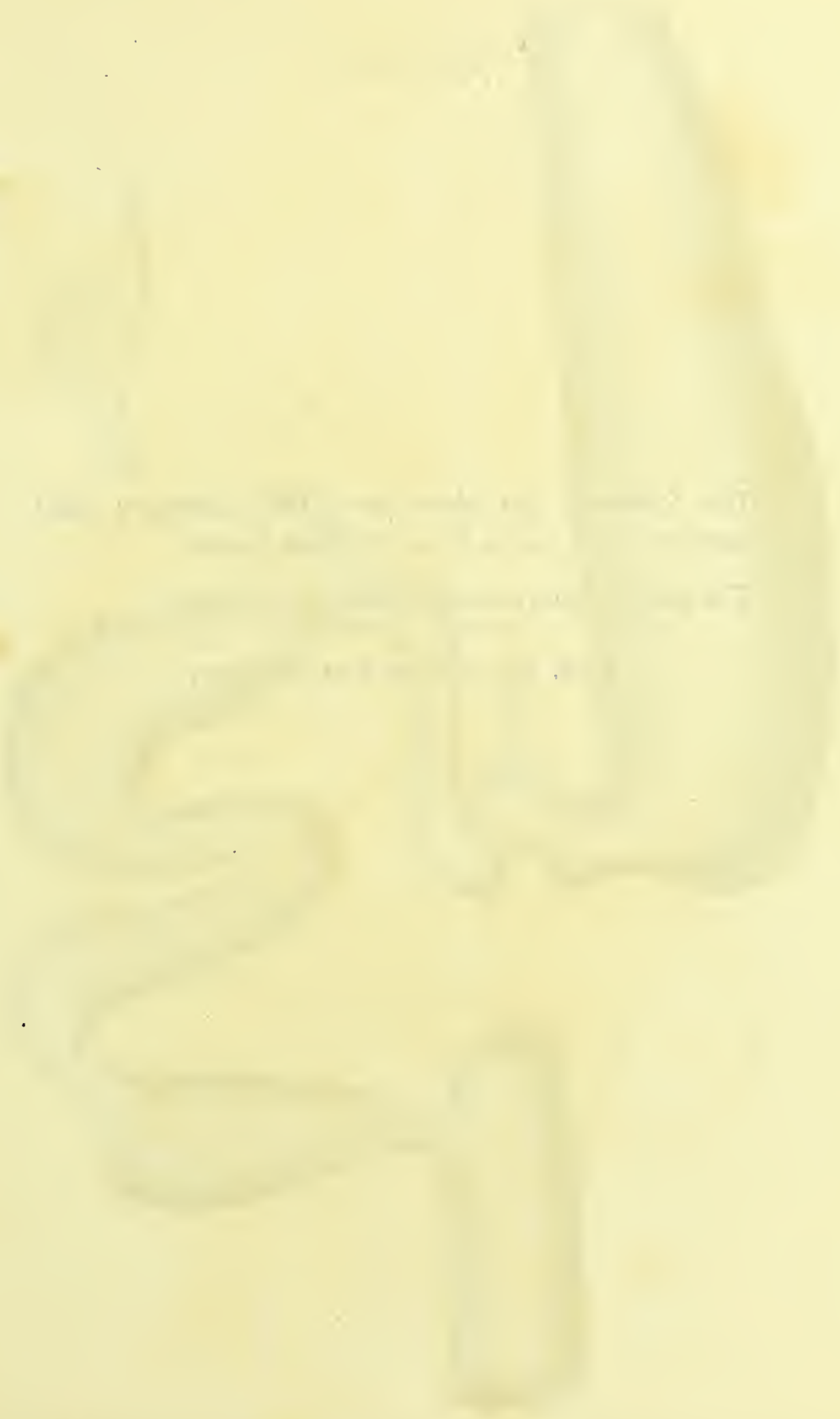
p p. Two external openings leading into the cavity of the abdomen.

q q. The two holders, in their collapsed state.



W. Clift del.

F. Bauer sc.



The following five plates shew the alimentary canal through its whole course in amphibibious animals.

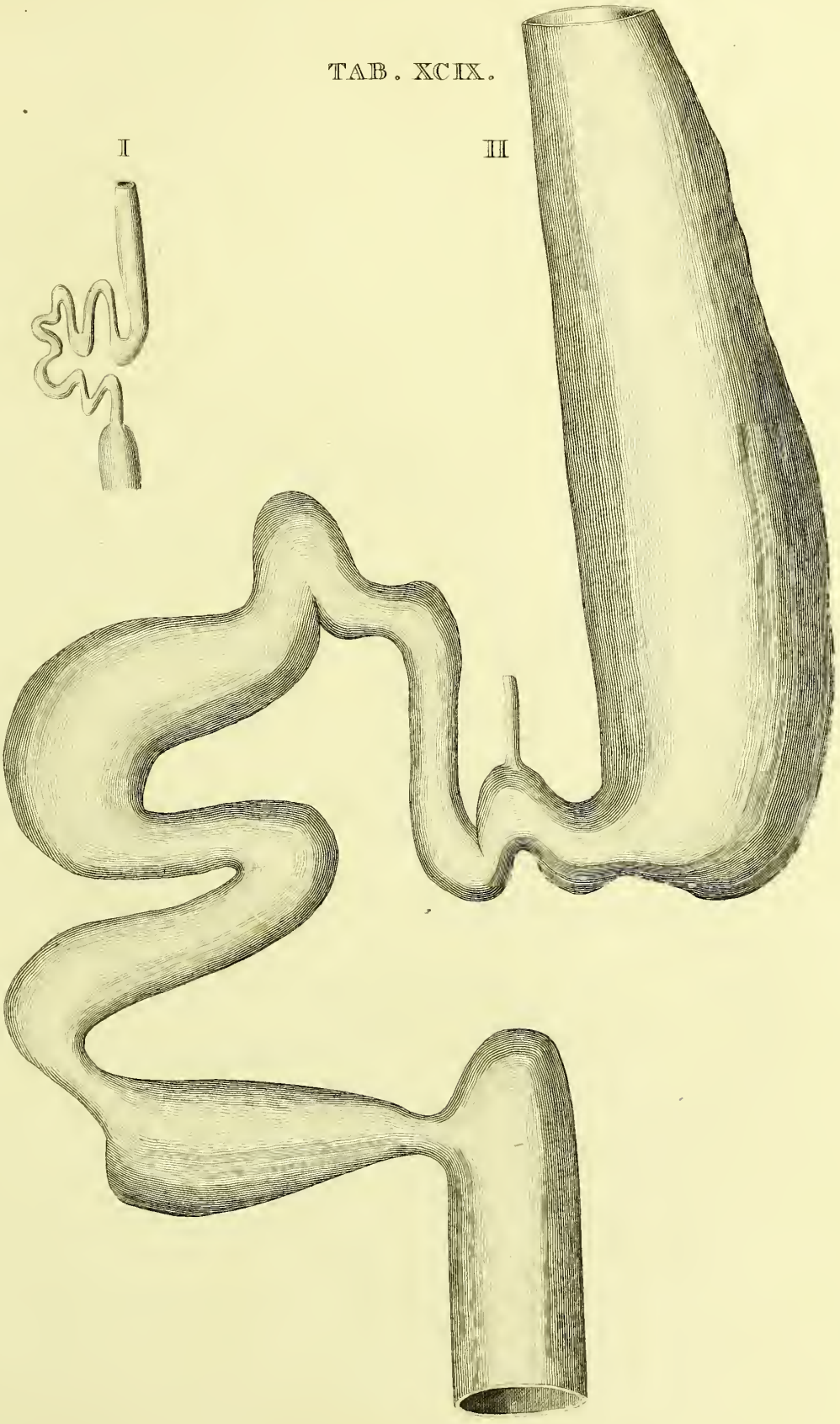
The name of each animal is inserted in the plate.

TAB. XCIX. is the first of this set.

TAB. XCIX.

I

II

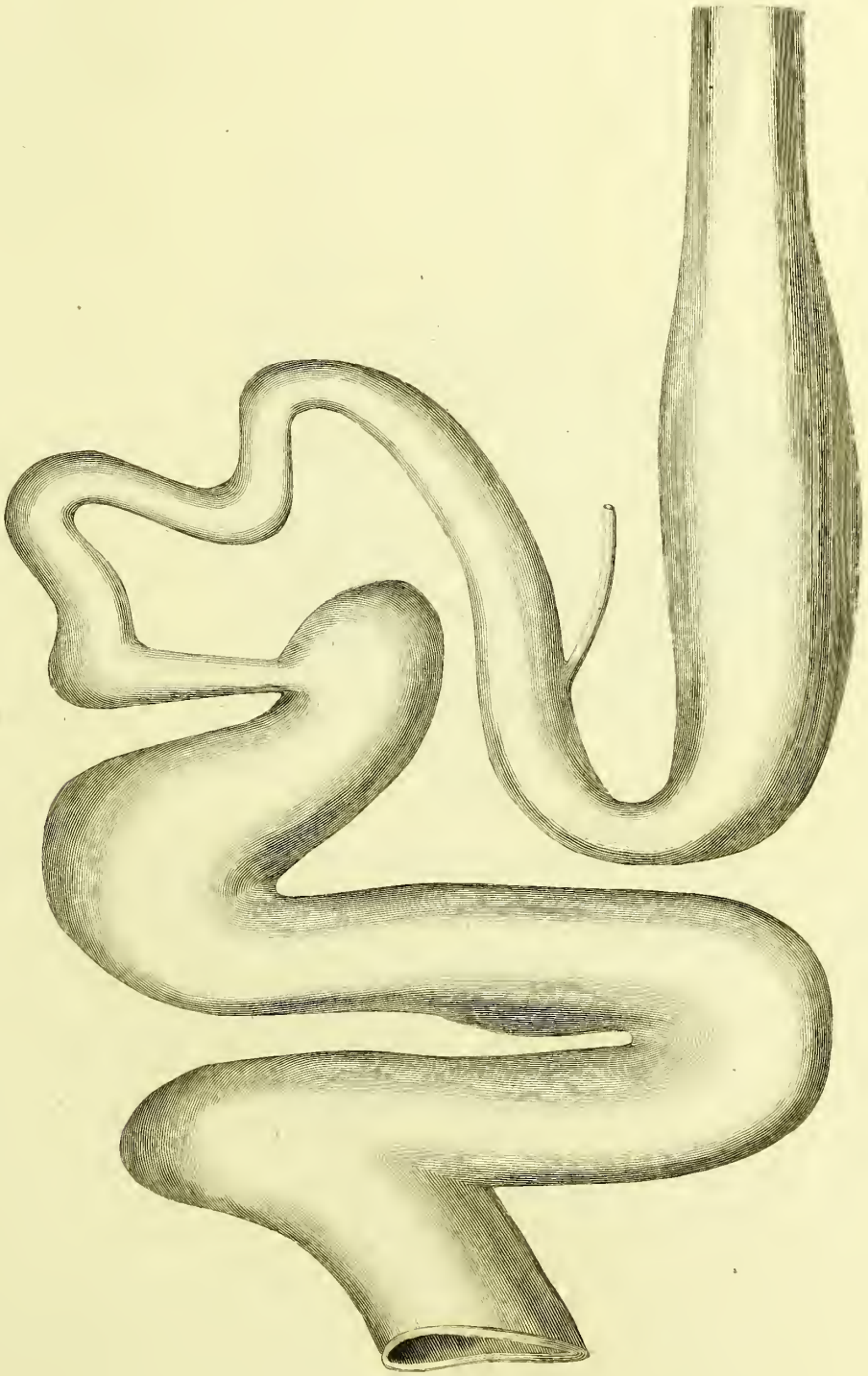


I. LACERTA SALAMANDRA. II. LACERTA SCINCUS.

W. Clift del.

J. Basire sculp.

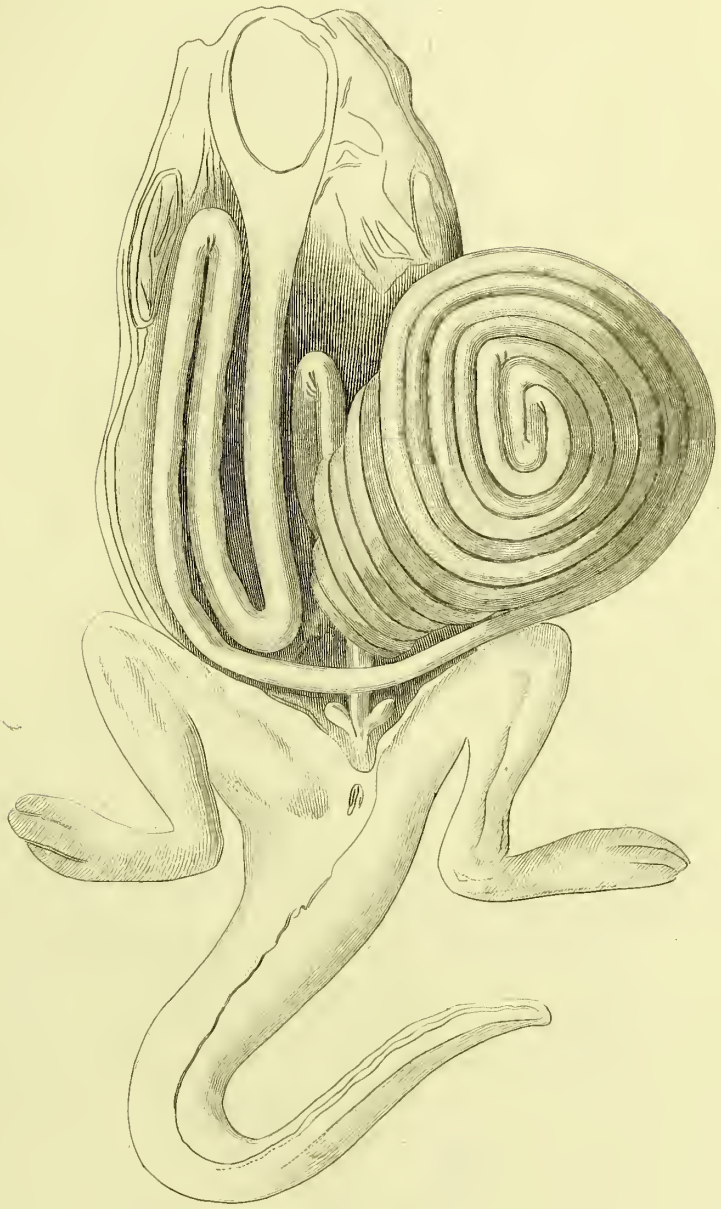
TAB. C.



BROAD-TAILED IGUANA.

W. Clift del. T. Basire sculp.

TAB. CI.



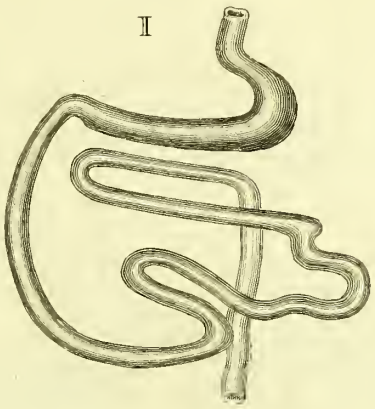
RANA PARADOXA.

W. Clift del

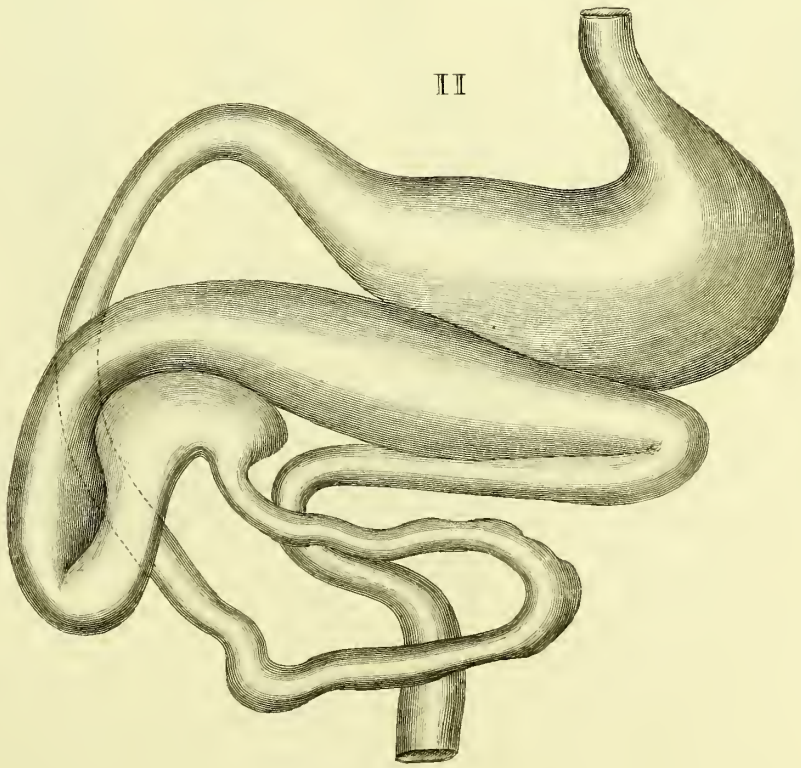
J. Basire sc.

TAB. CII.

I



II

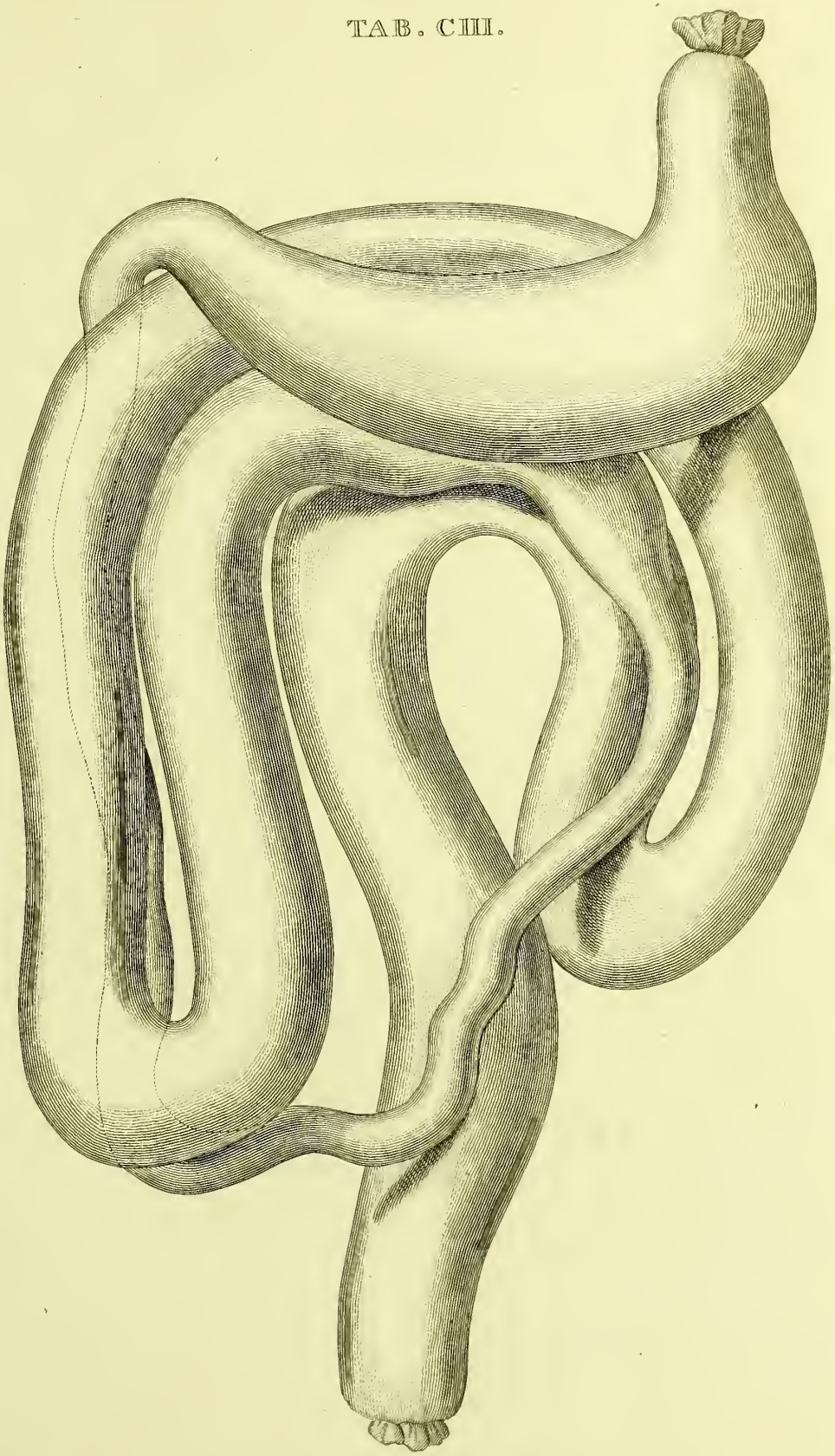


I. TURTLE, MUSQUITO SHORE. II. LAND TORTOISE.

W. Clift del.

J. Basire sculp.

TAB. CIII.



TORTOISE, SOUTH CAROLINA.

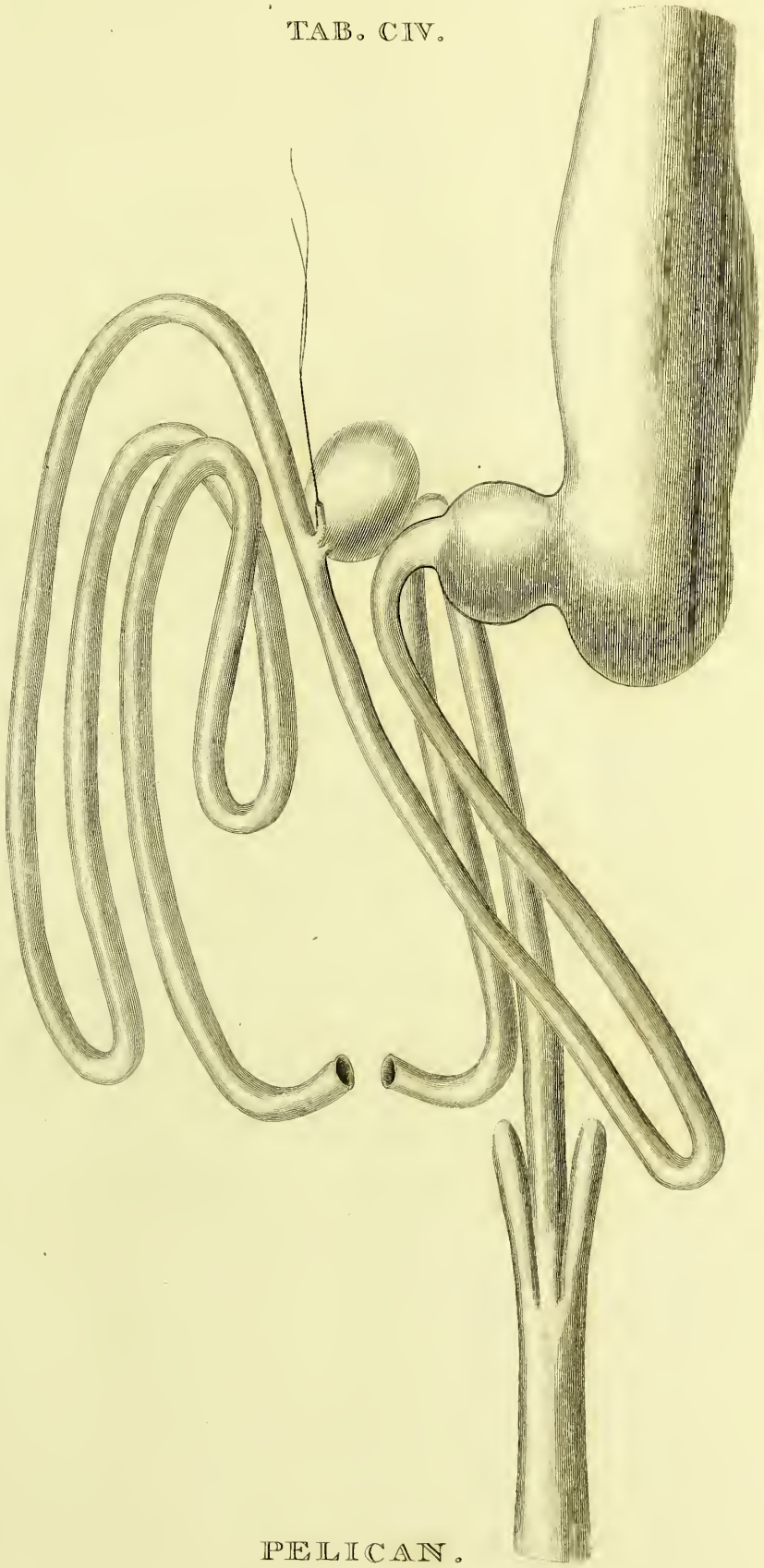
W.C. Lift del. J. Basire sculp.

The nine following plates exhibit the course of the intestinal canal, with the varieties in the form of the cœca in carnivorous, piscivorous, and granivorous birds.

The name is inserted in each plate.

TAB. CIV. is the first of this set.

TAB. CIV.

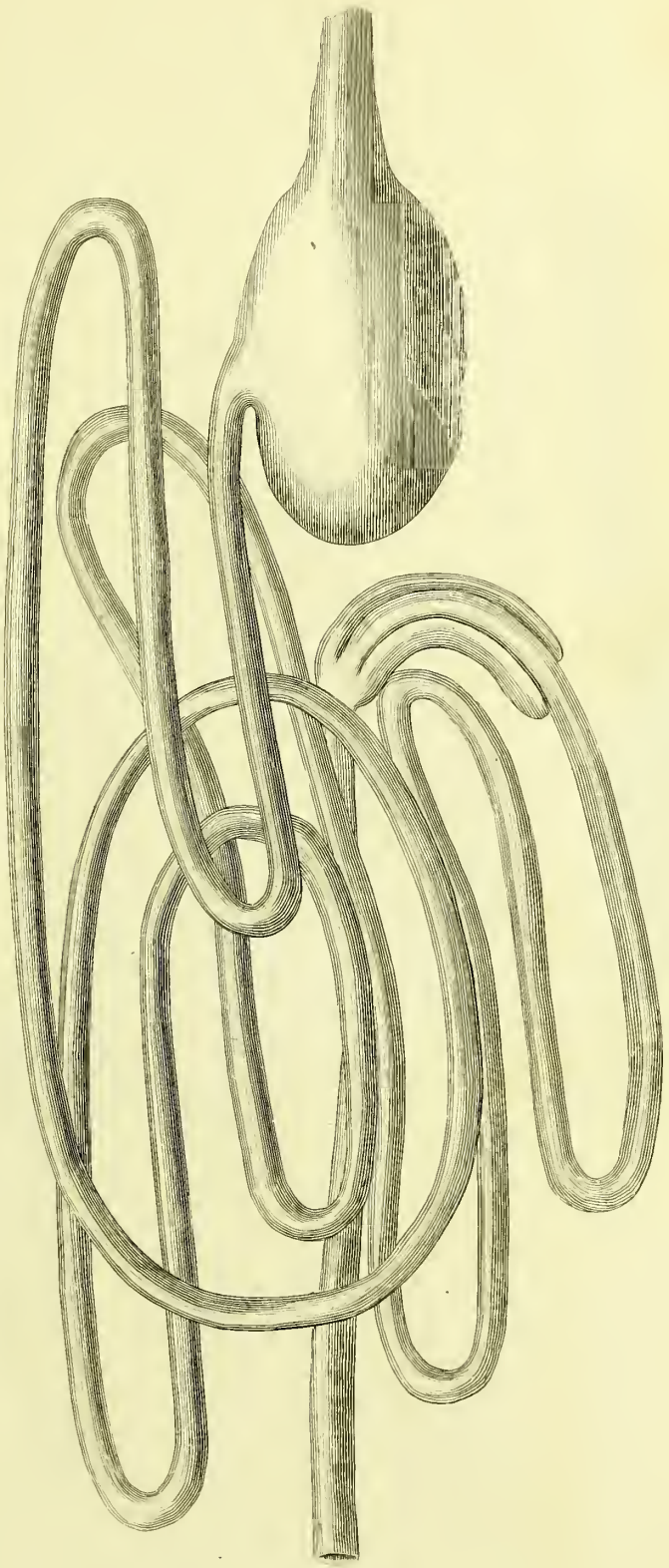


PELICAN.

W. Clift del.

J. Basire sculp.

TAB. CV.

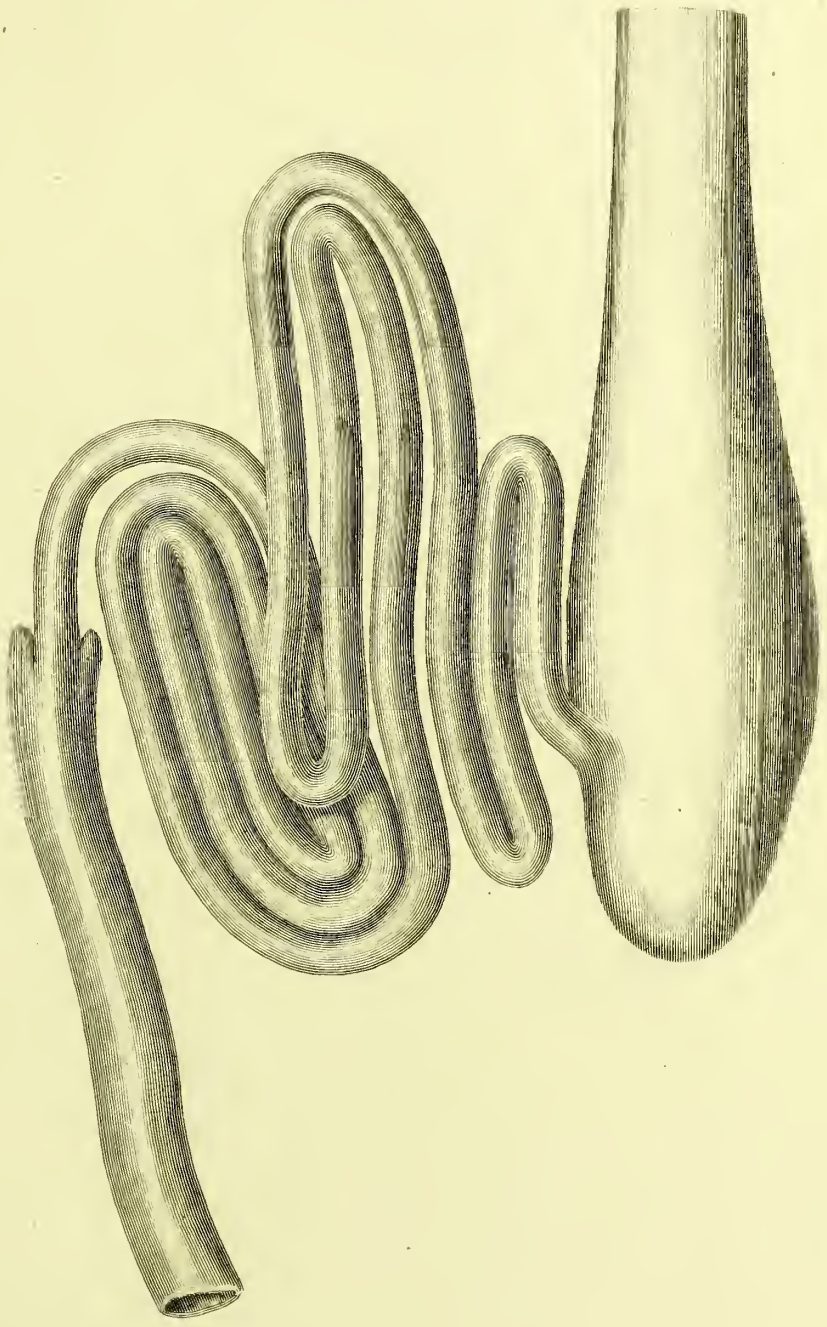


CRANE.

W. Clift del.

T. Bussre sc.

TAB. CVI.

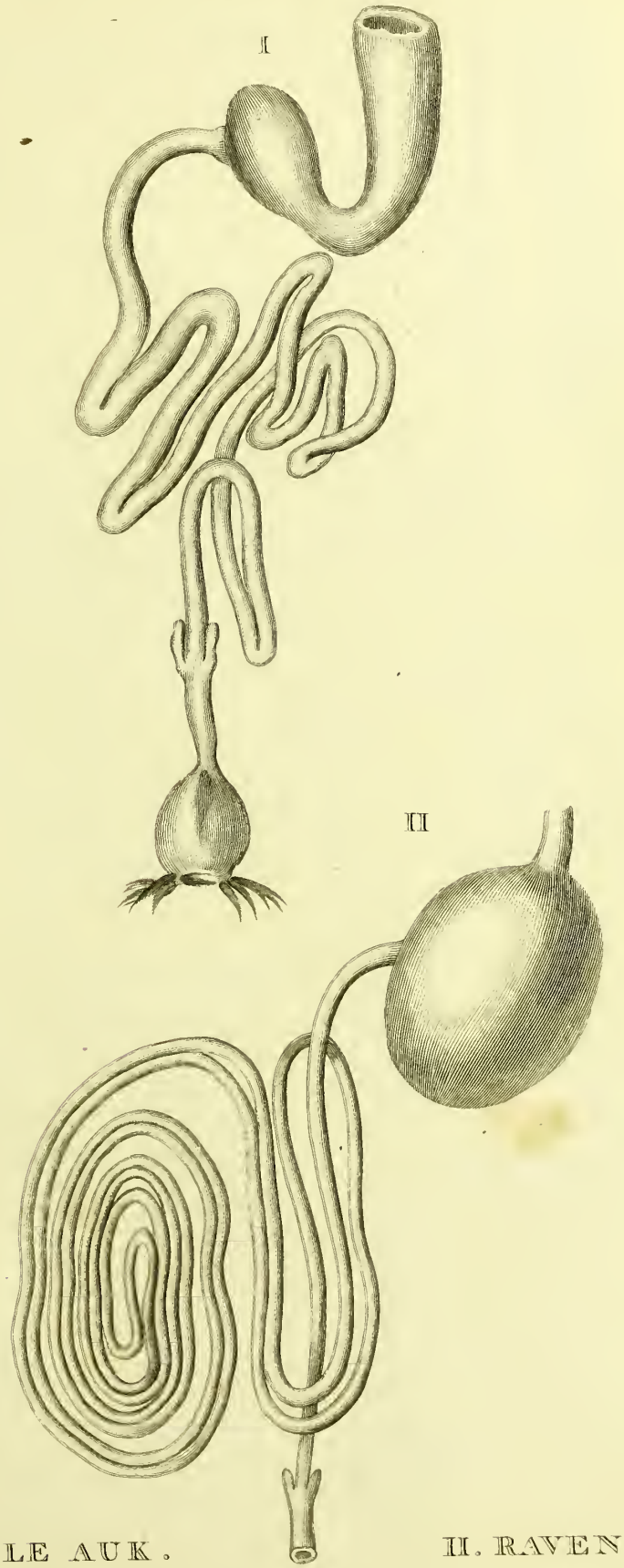


SOLAND GOOSE.

W. Clift del.

T. Bonnor sculp.

TAB. CVII.

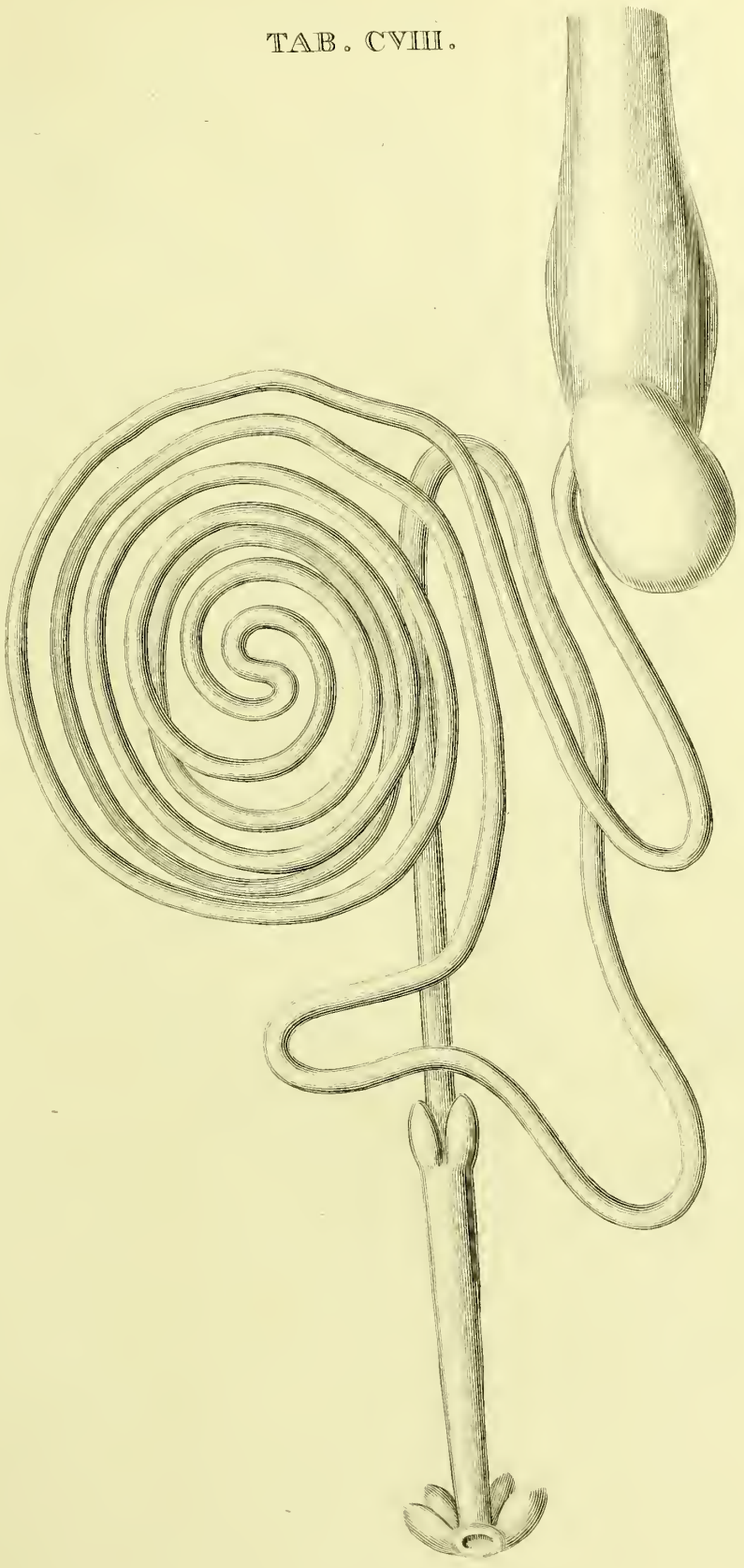


I. LITTLE AUK. II. RAVEN.

W Clift del

J. Basire sculp.

TAB. CVIII.

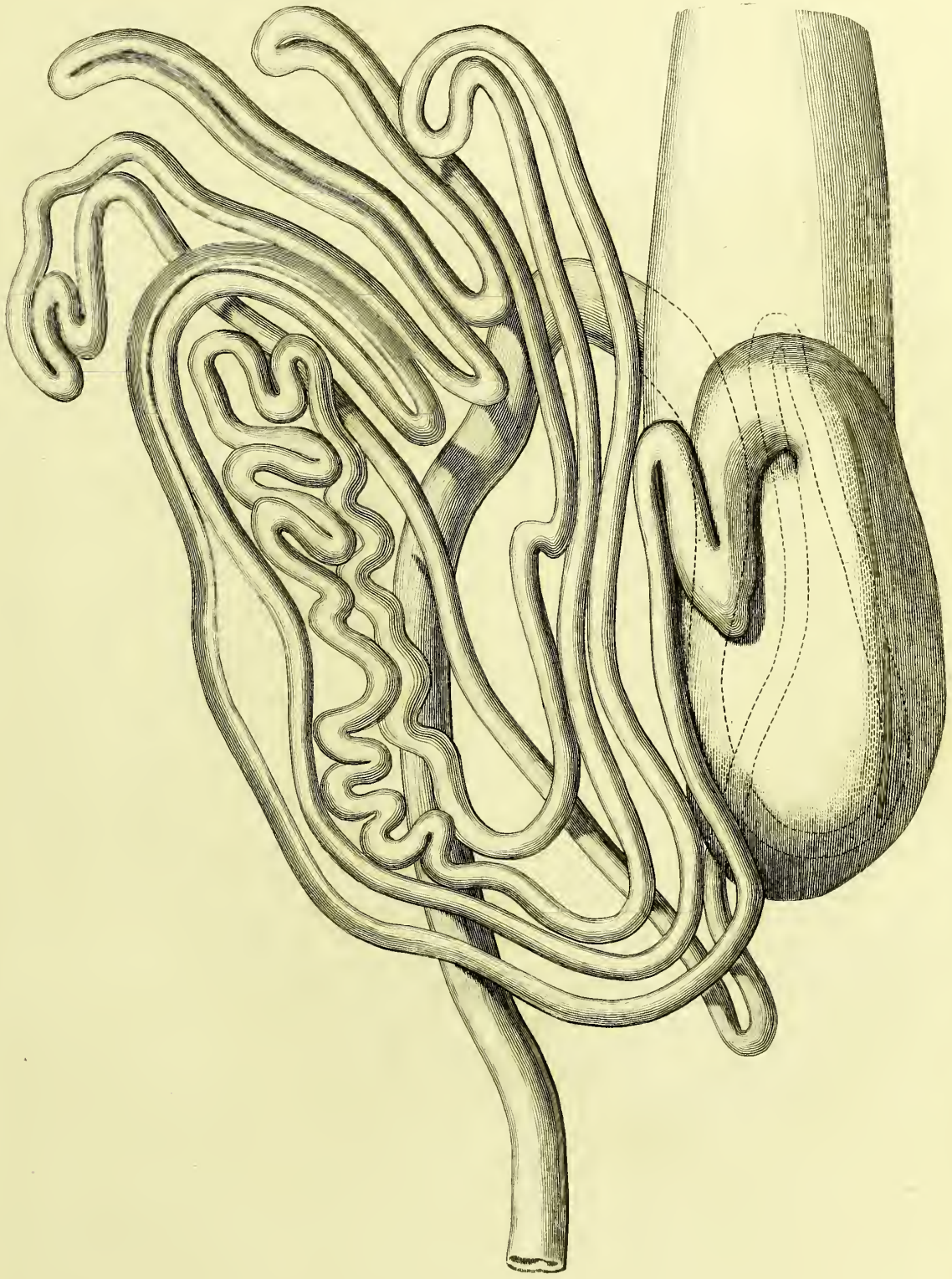


SEA-MEW.

W. Clift del.

J. Basire sculp.

TAB. CIX.

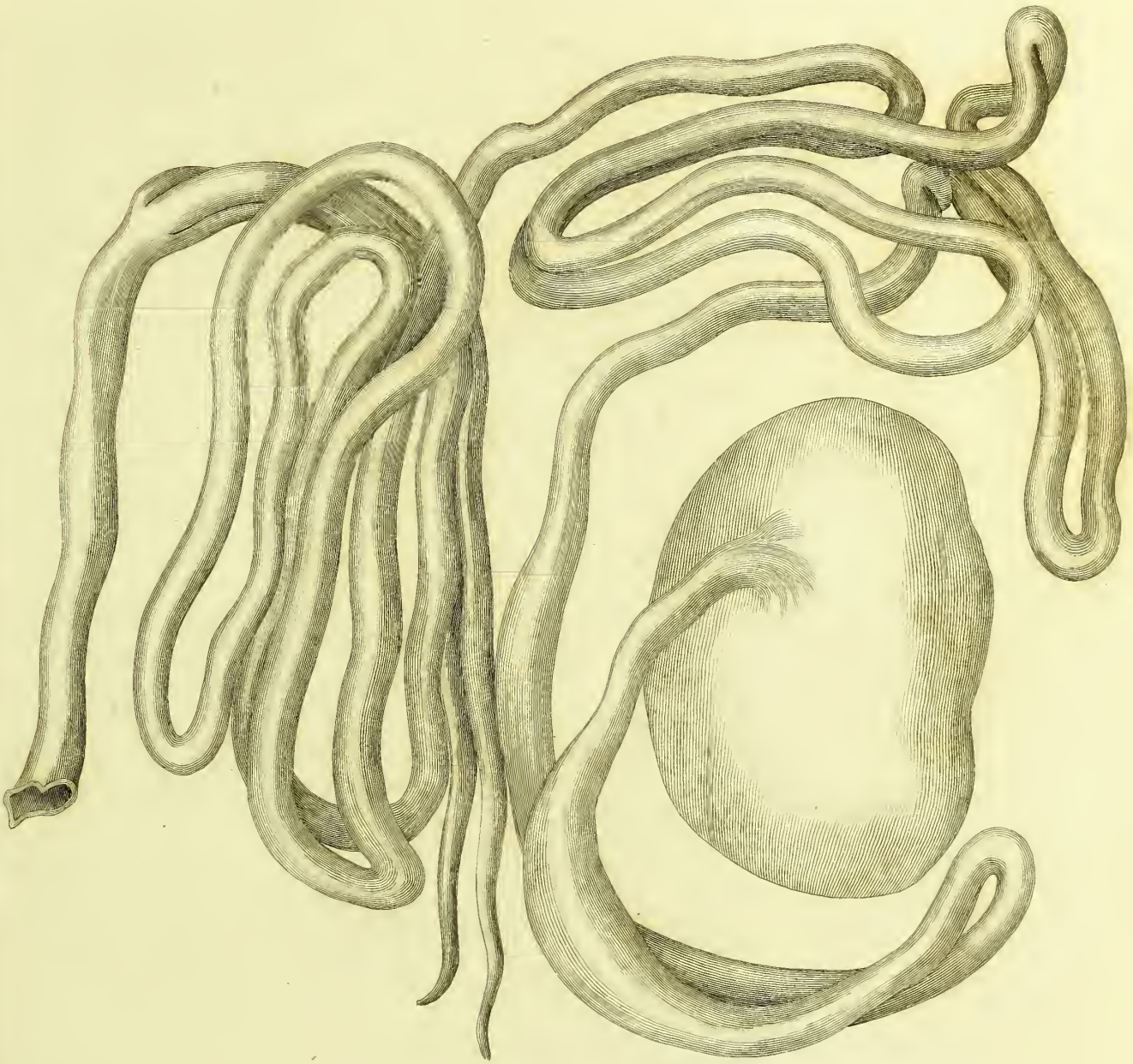


ARDEA ARGALA.

W. Clift del.

J. Basire sc.

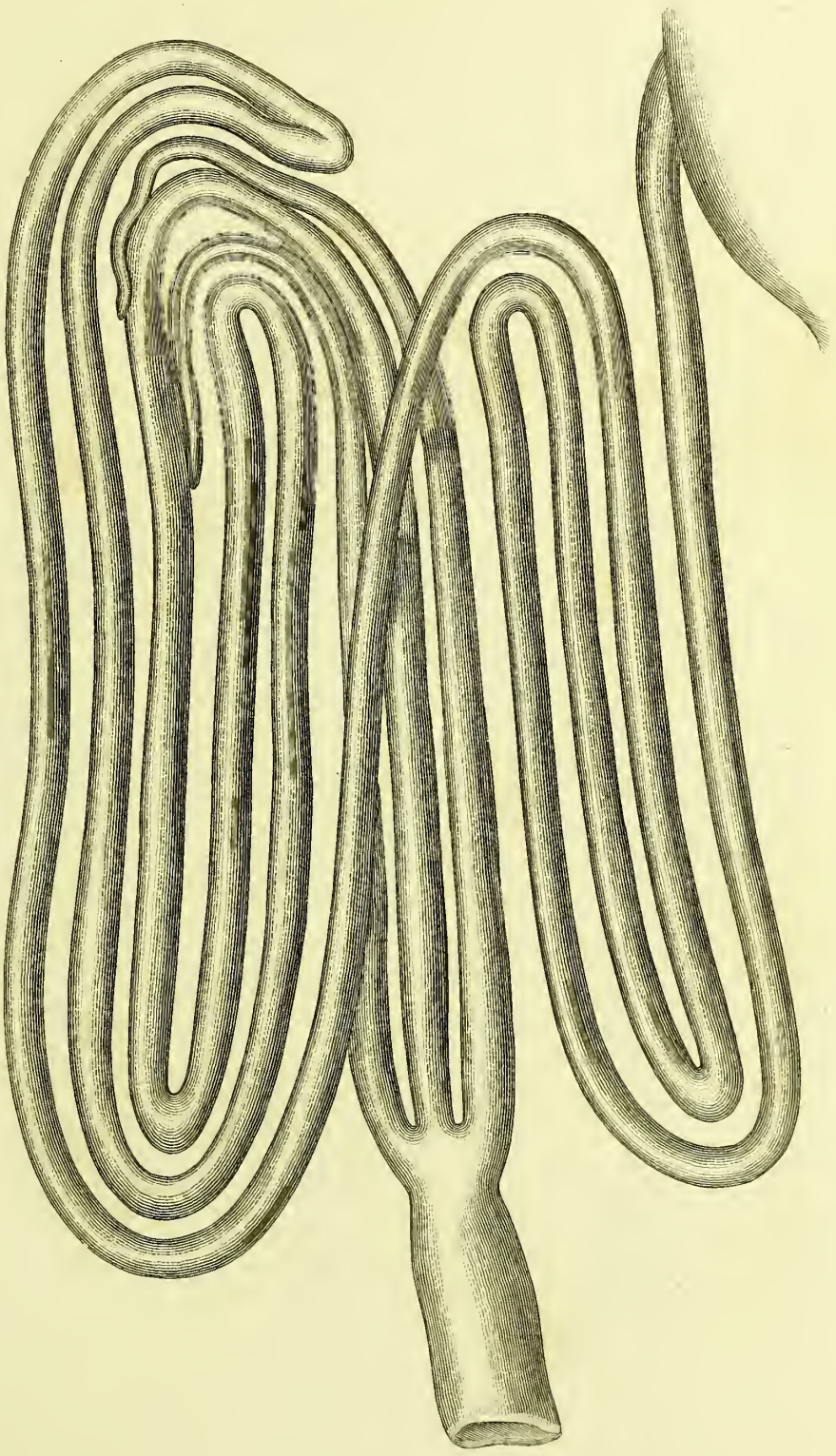
TAB. CX.



WILD DUCK.

W. Clift del. J. Basire sc.

TAB. CXI.

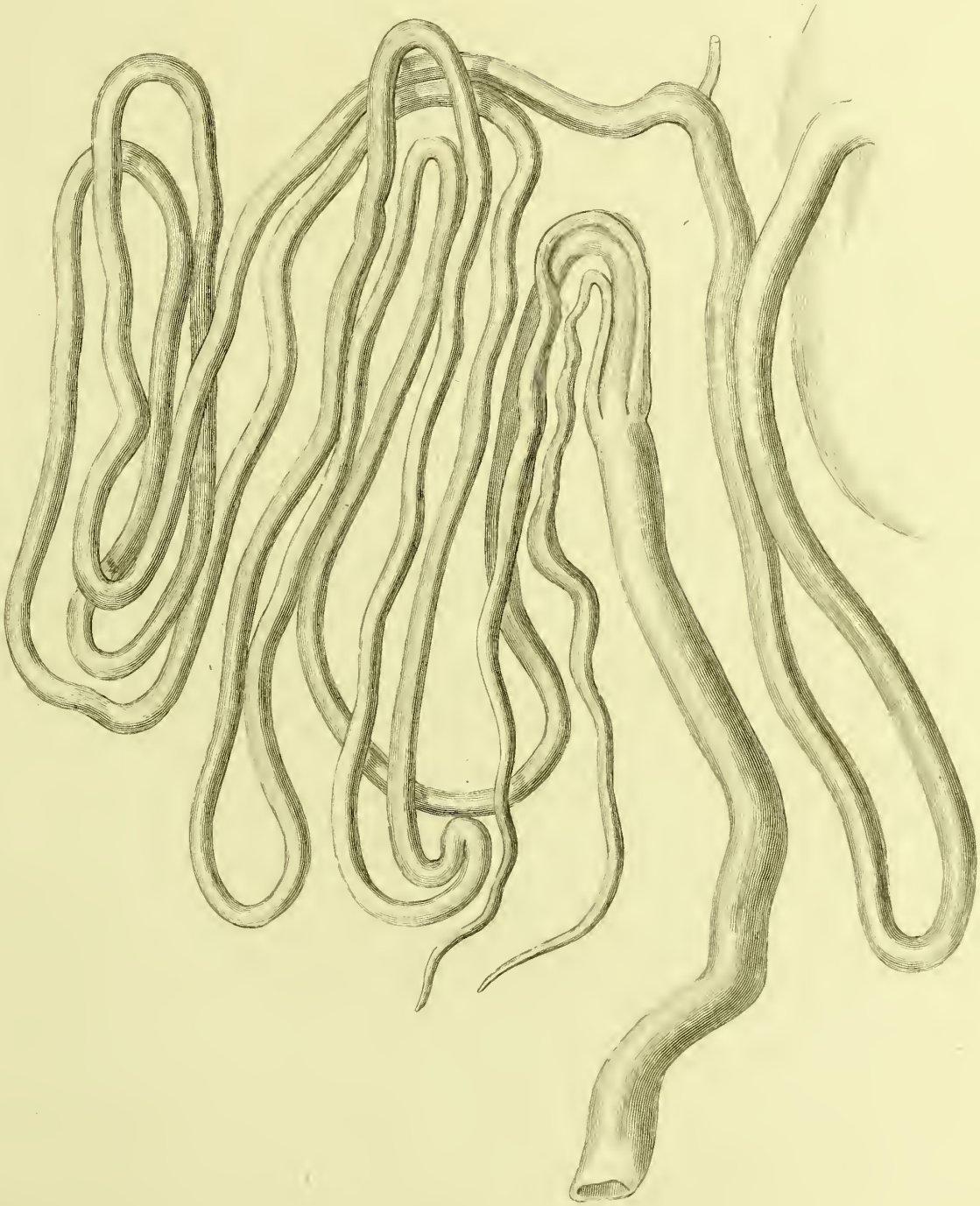


GOOSE.

W. Clift del.

J. Basire sculp.

TAB. CXII.



WILD SWAN.

W. Clift del.

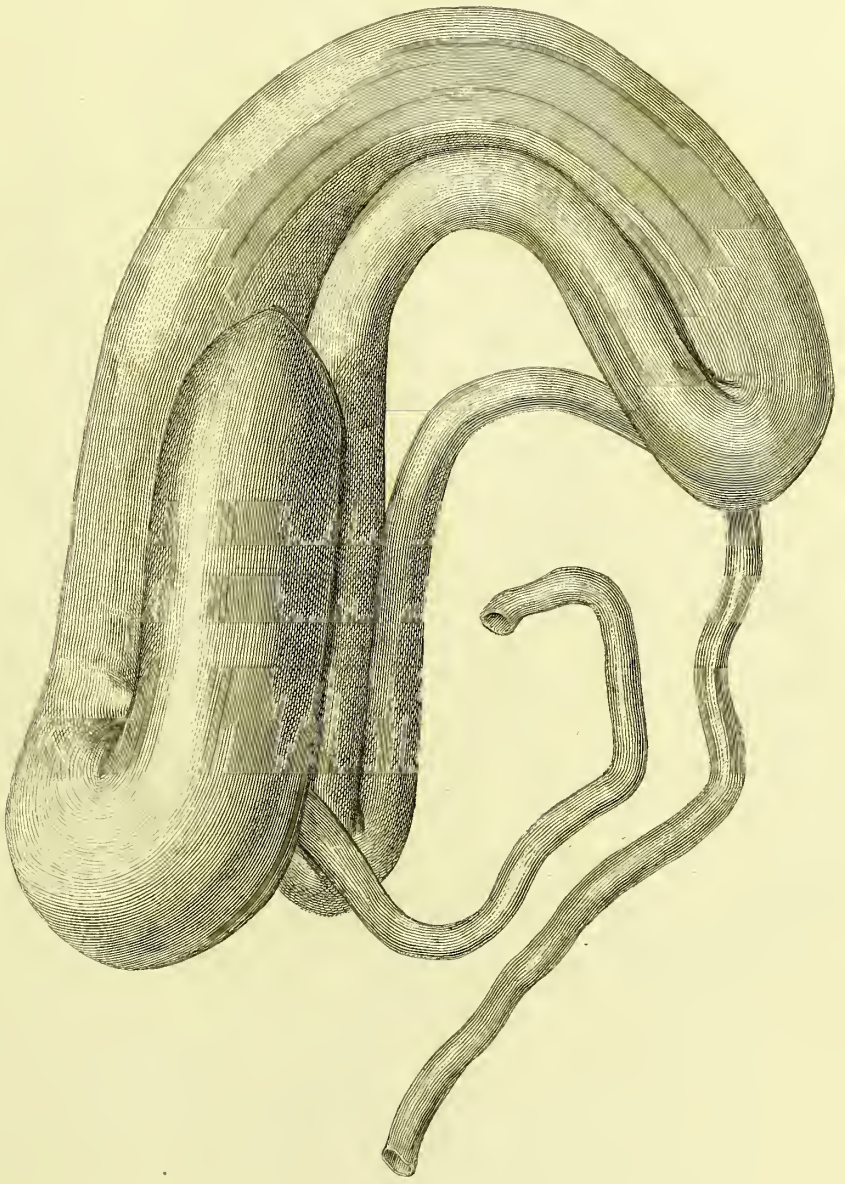
J. Basire sculp.

TAB. CXIV.

HORSE.

W. Clift del. J. Basire sc

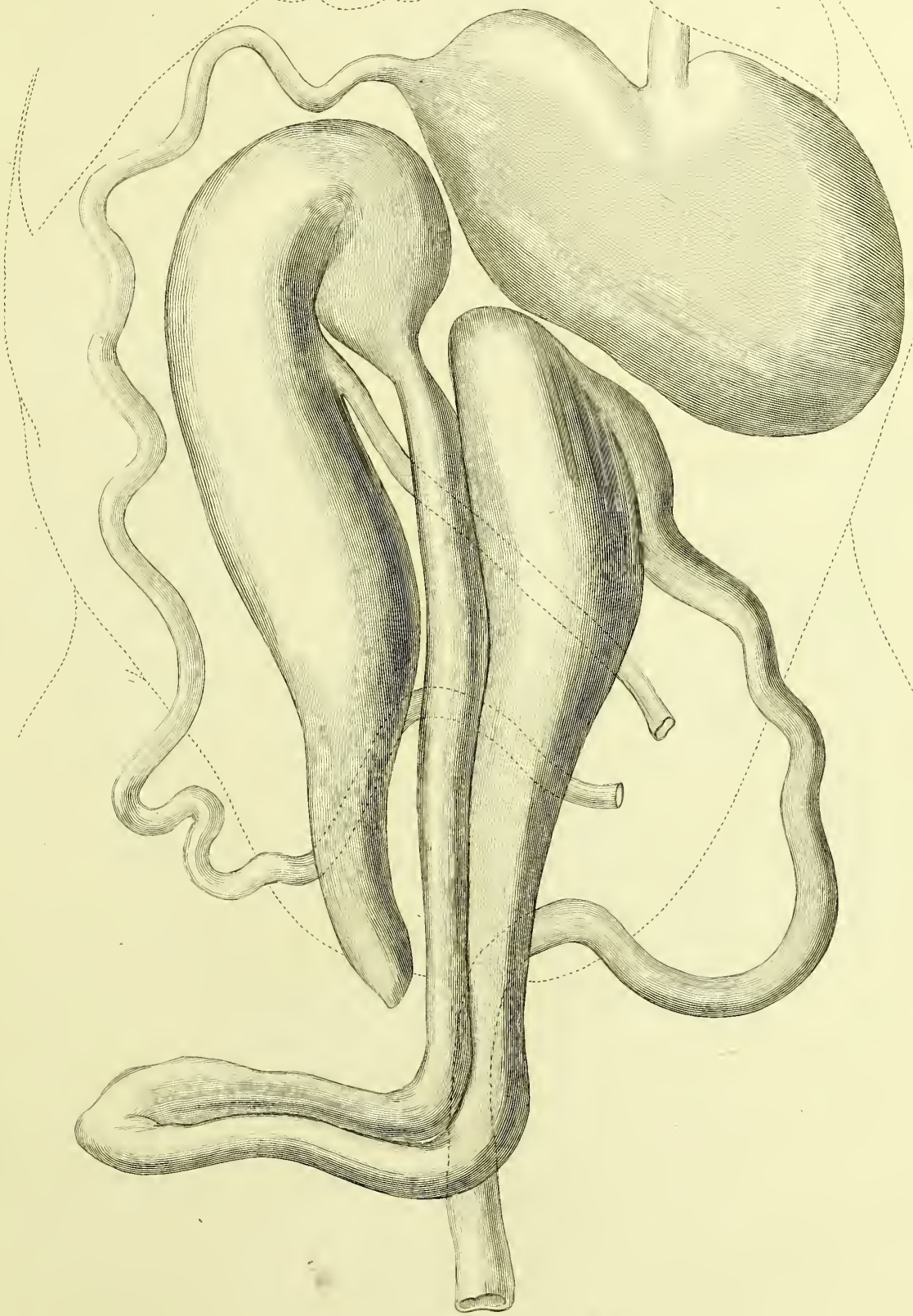
TAB. CXV.



ZEBRA.

W. Clift del

J. Basire sculp.

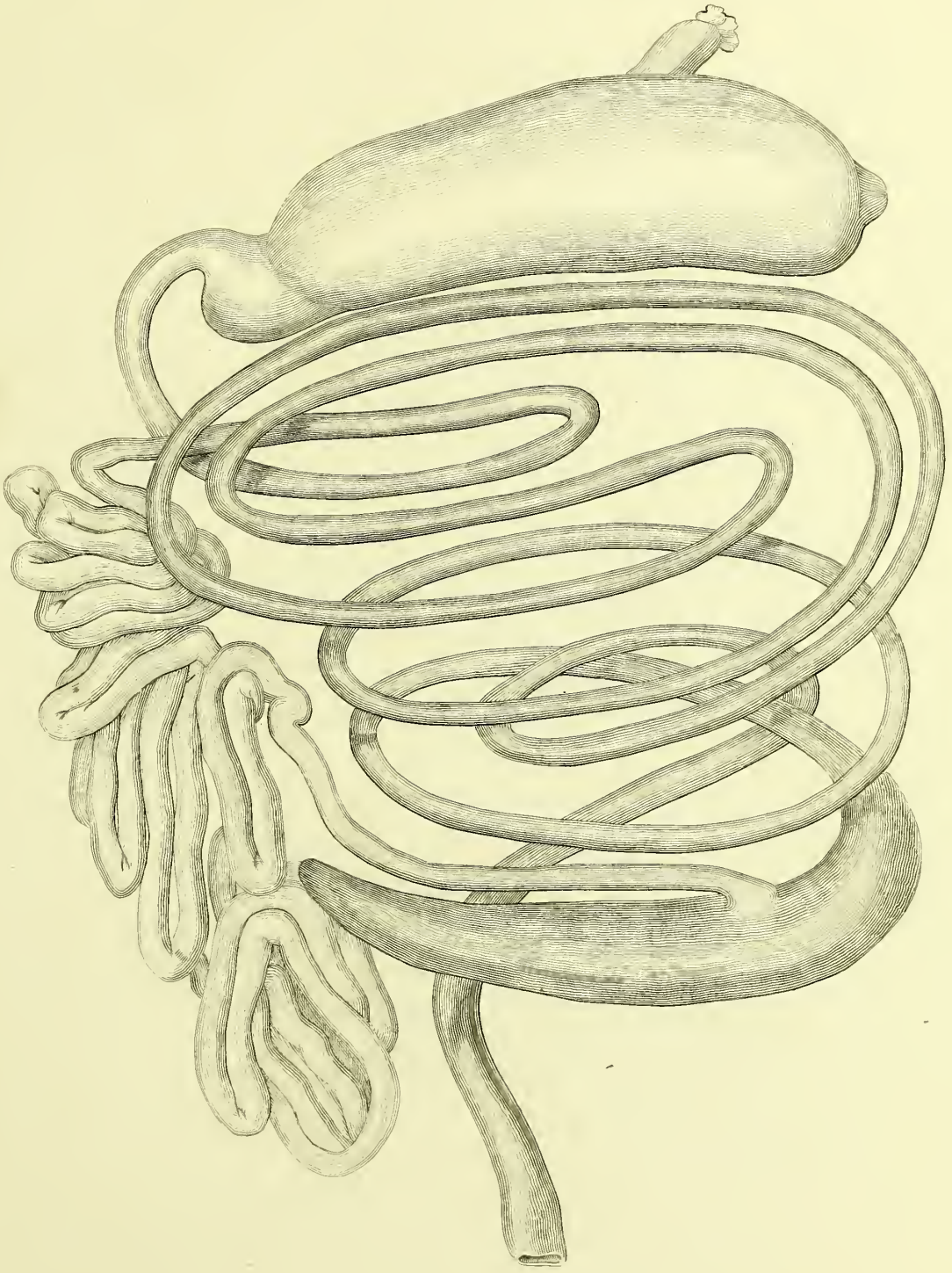


TAPIR.

W.m Clift del.

J. Basire sculp.

TAB. CXVII.

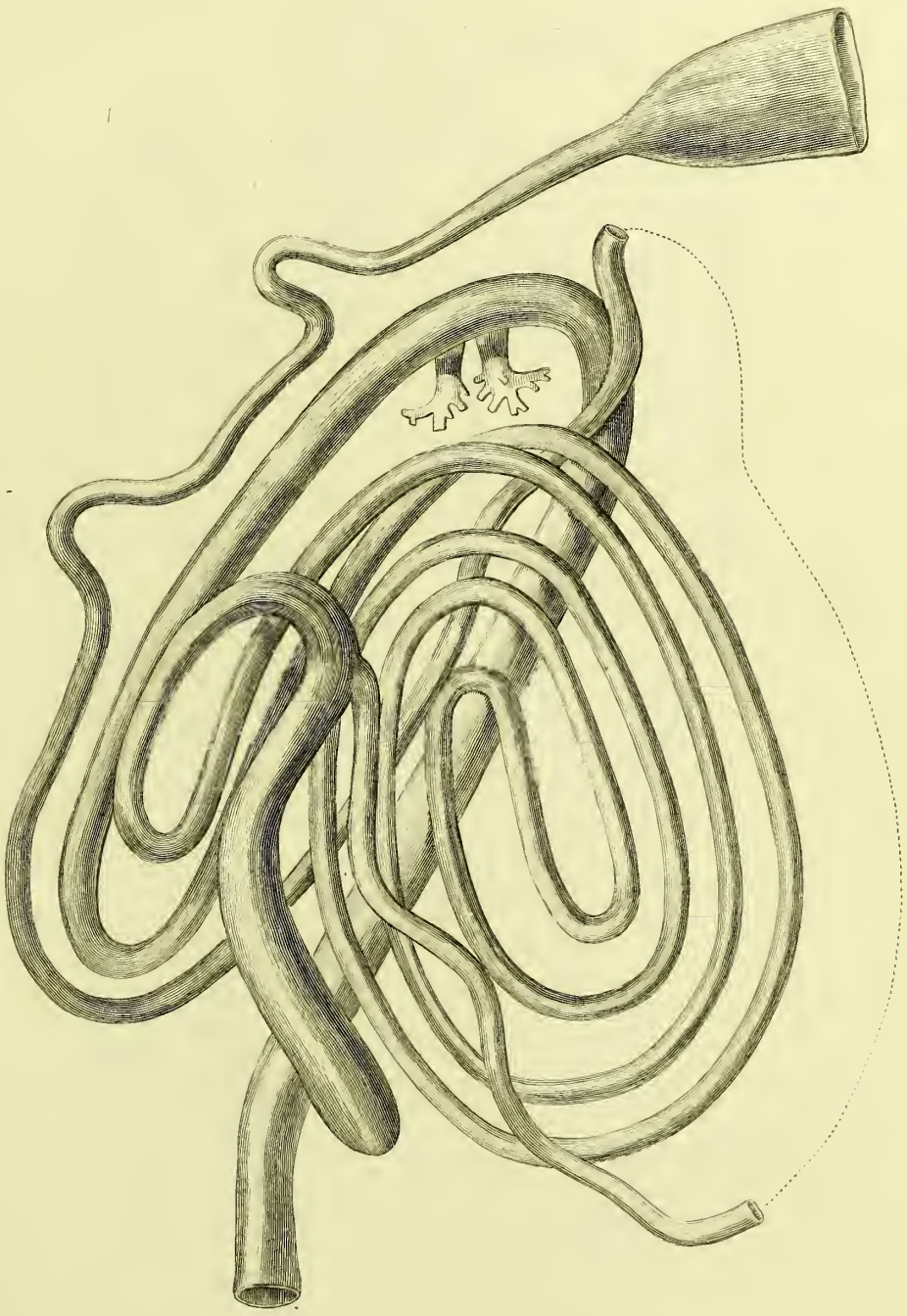


HOG.

W. Clift del

J. Basire sculp.

TAB. CXVIII.

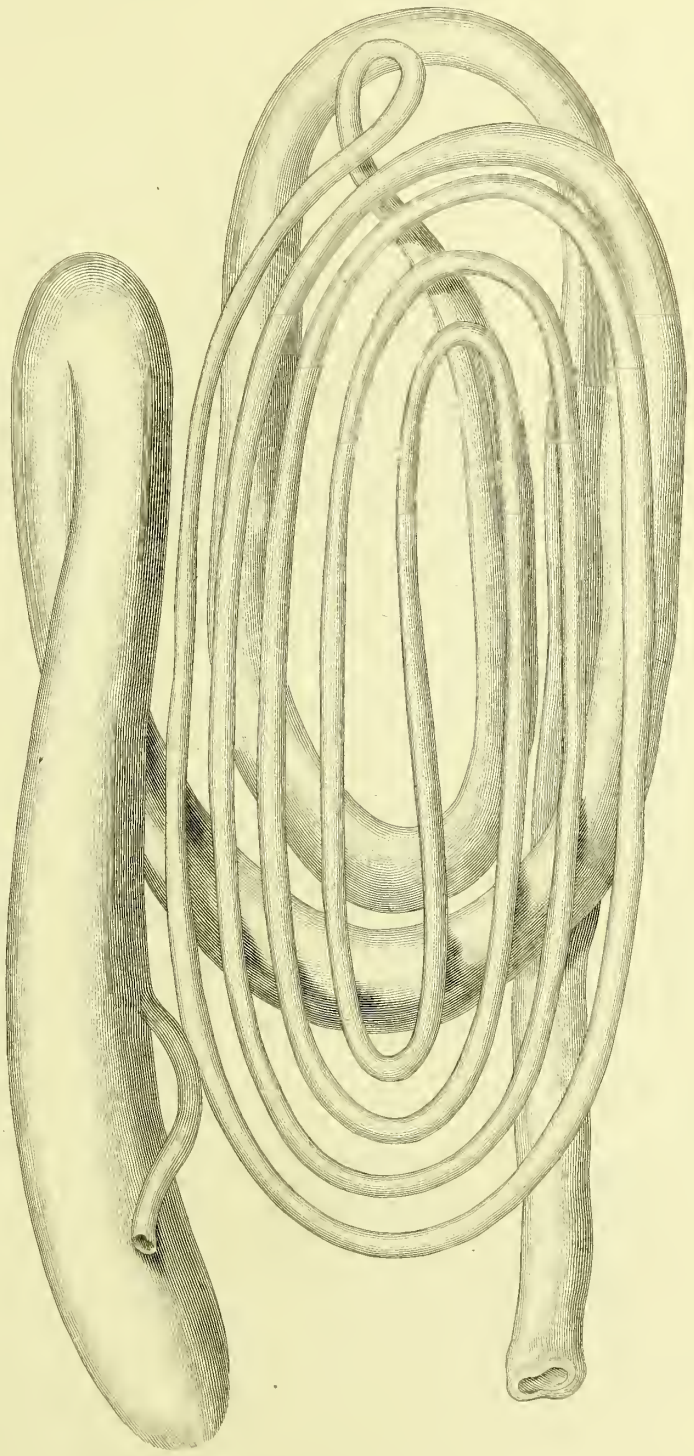


COW.

W. Clift del

J. Basire sc

TAB. CXIX.

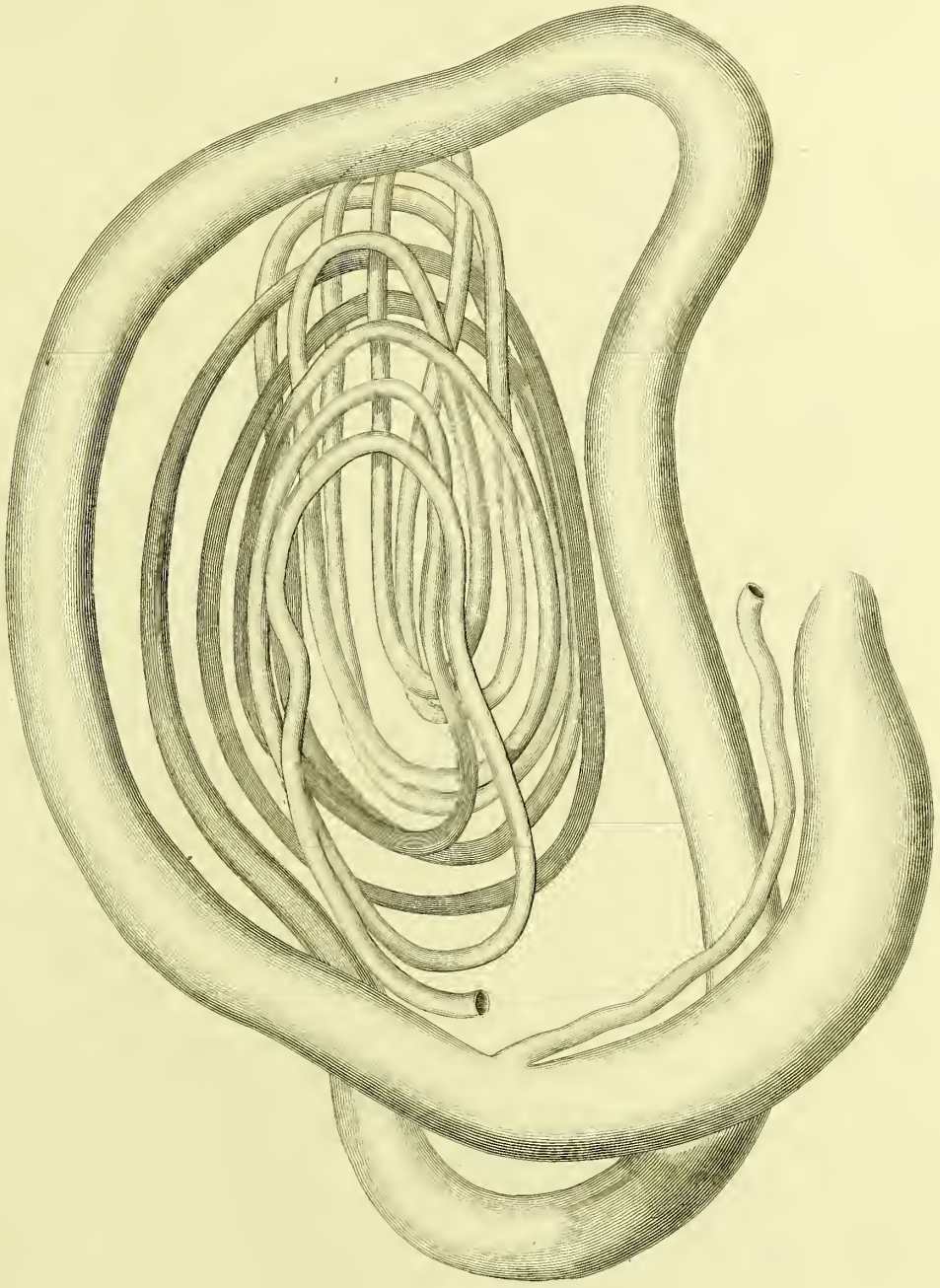


EAST INDIAN BULL.

W. Clift del.

J. Basire sculp.

TAB. CXX.

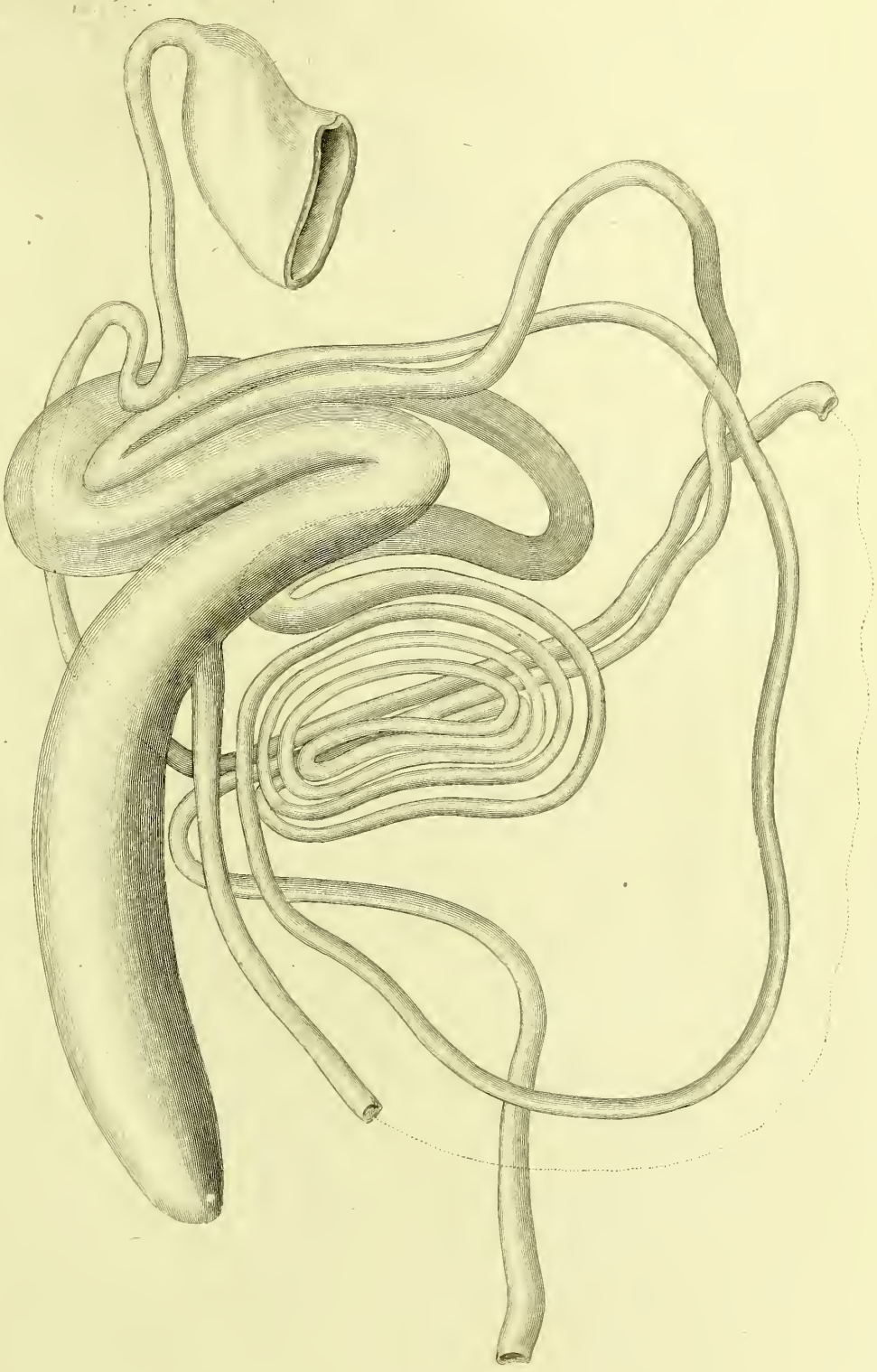


CAMEL.

W. Clift del.

J. Basire sc

TAB. CXXI.

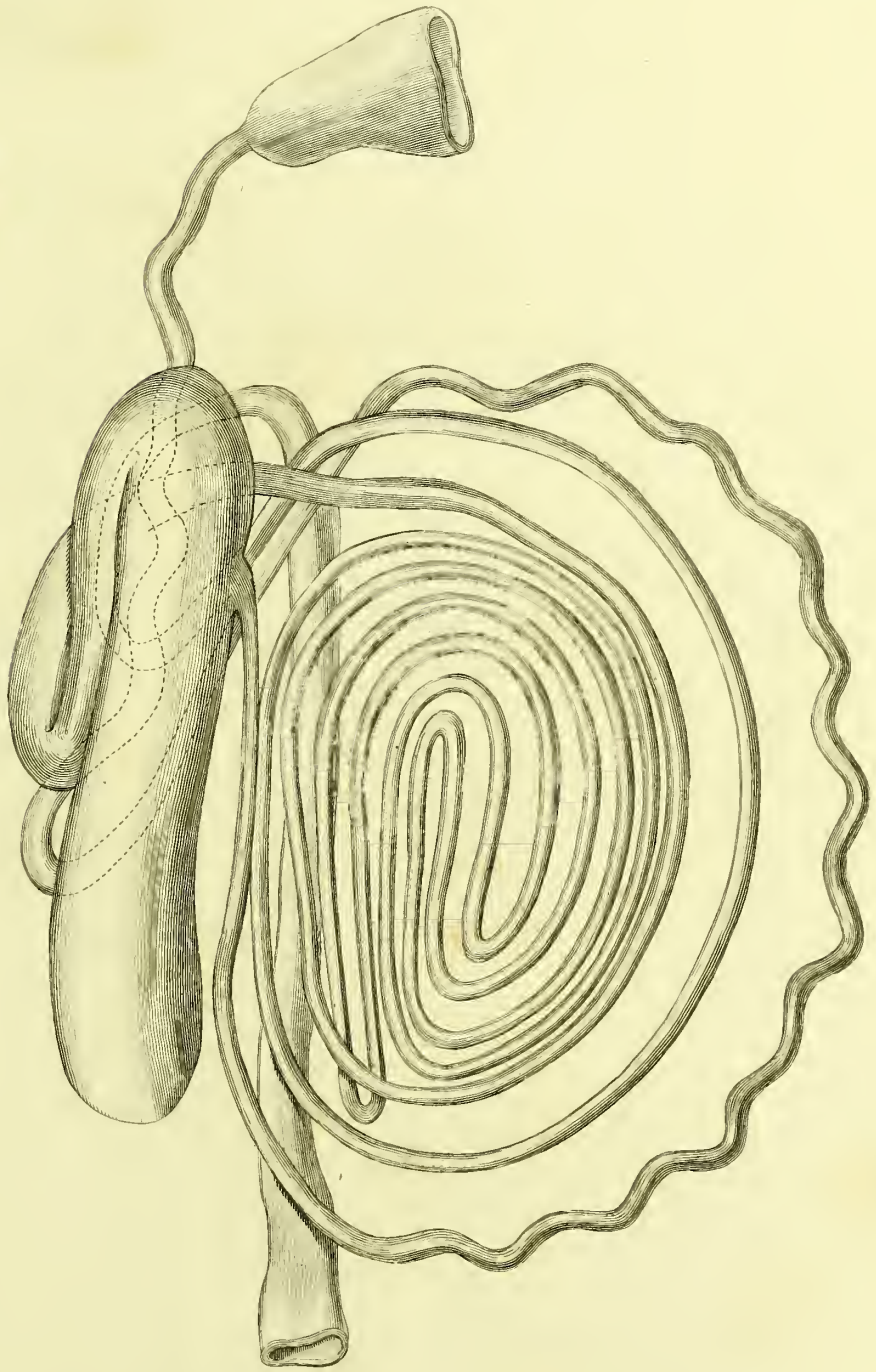


SHEEP.

W. Clift del.

T. Bonnor sculp.

TAB. CXXII.

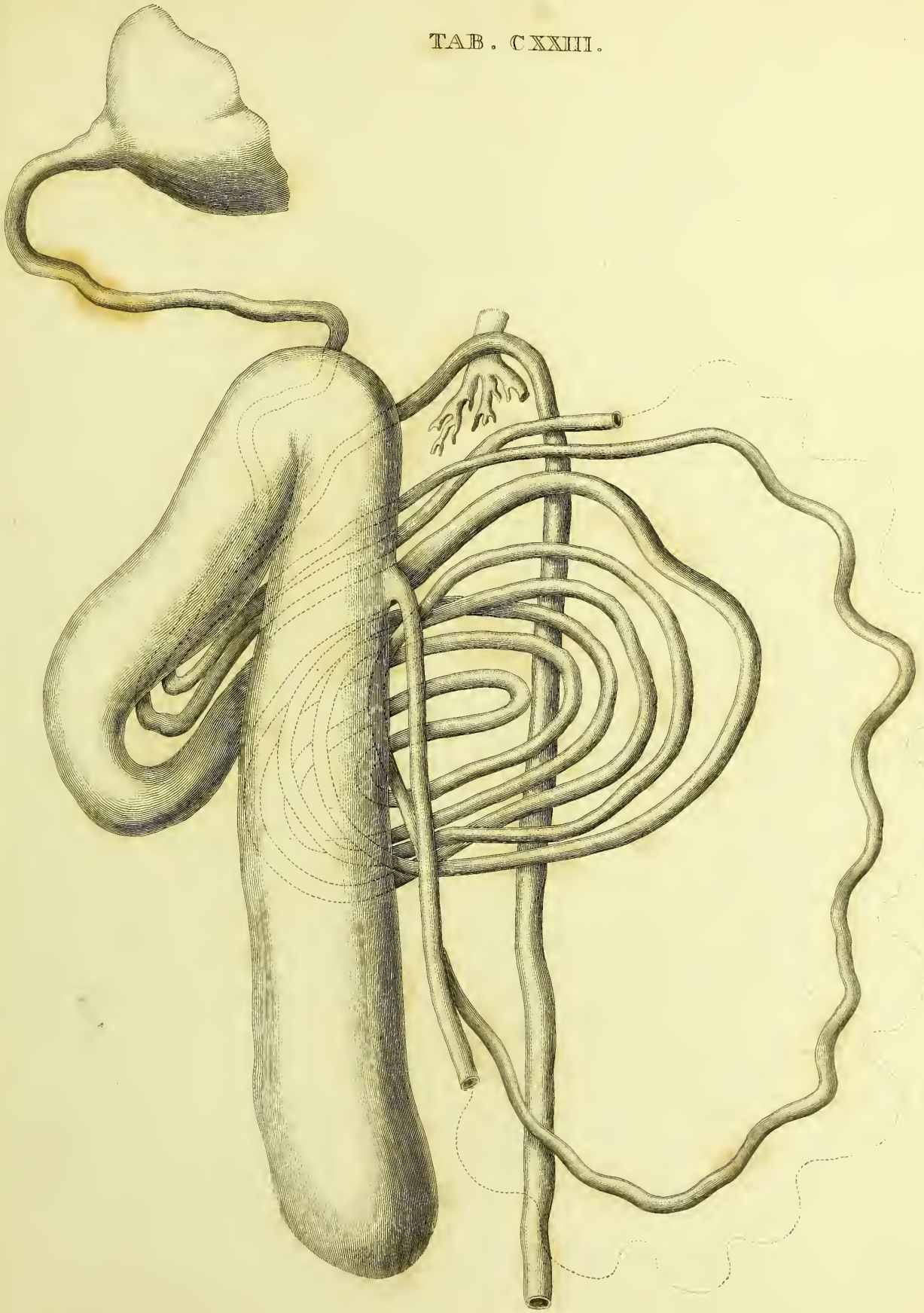


VIENNA SHEEP.

W. Clift del.

J. Basire sculp.

TAB. CXXIII.

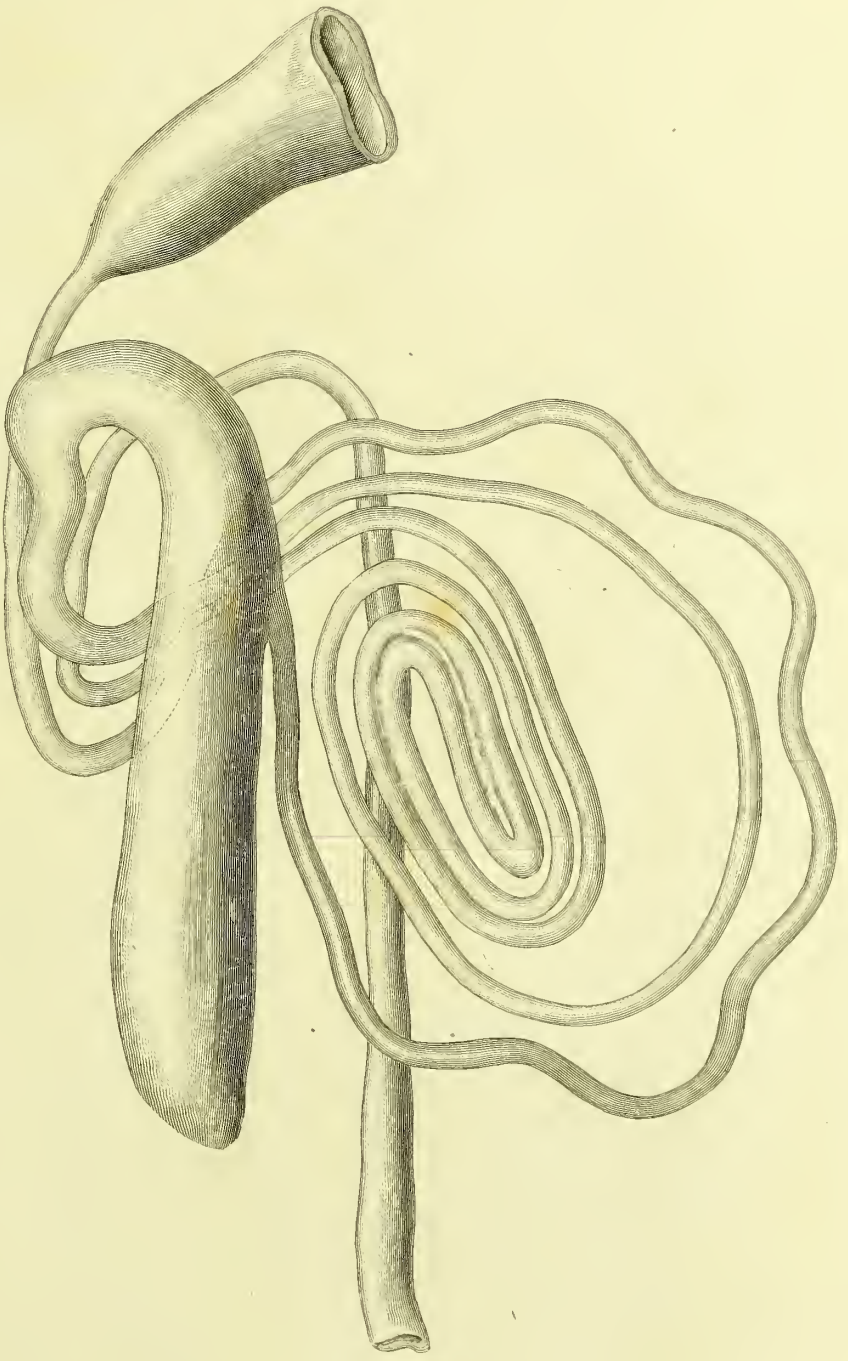


GOAT.

W. Clift del.

J. Basire sculp.

TAB. CXXIV.

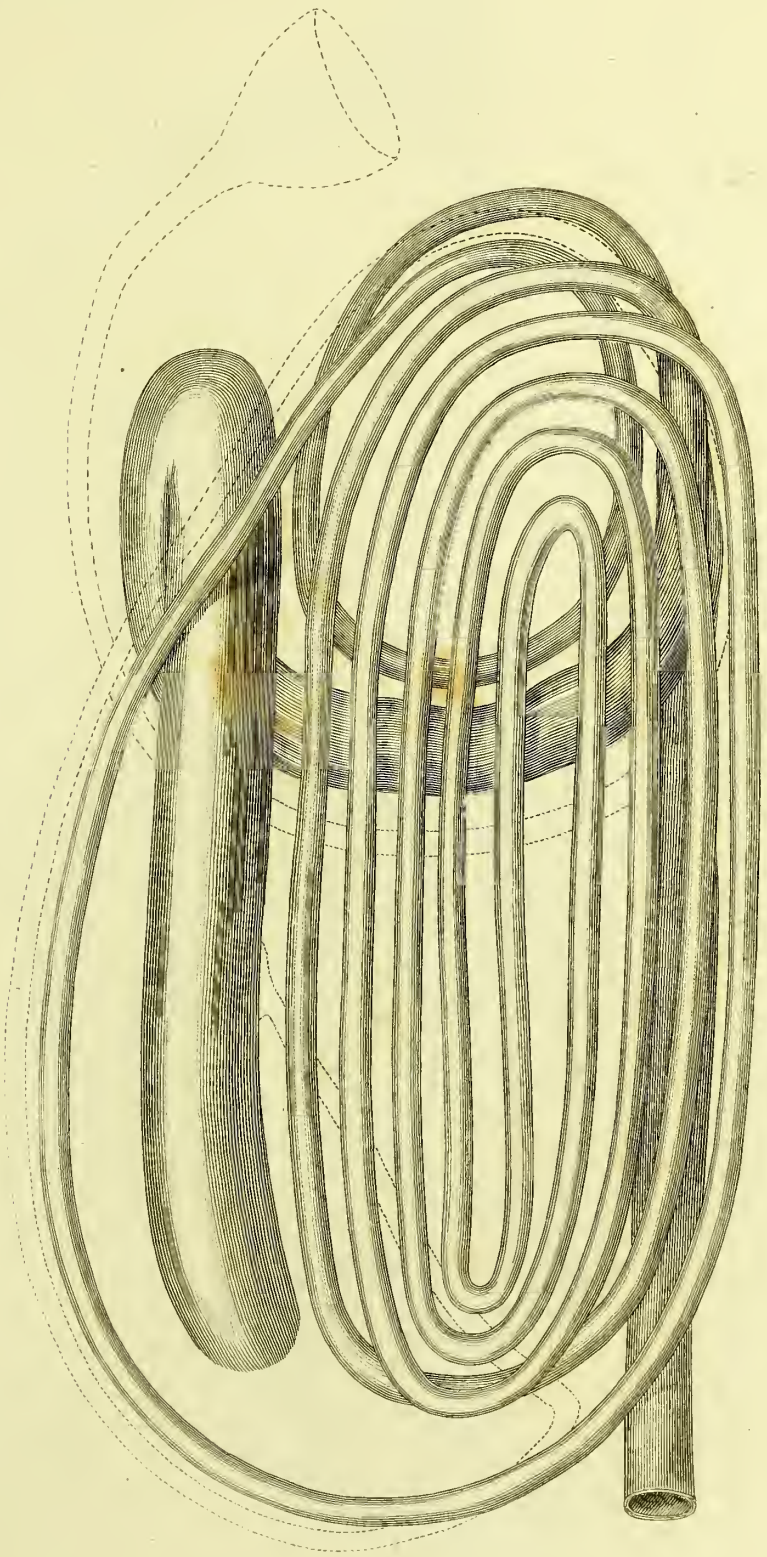


RING-HORNED ANTILOPE.

W. Clift del.

T. Bauer sc

TAB. CXXV.

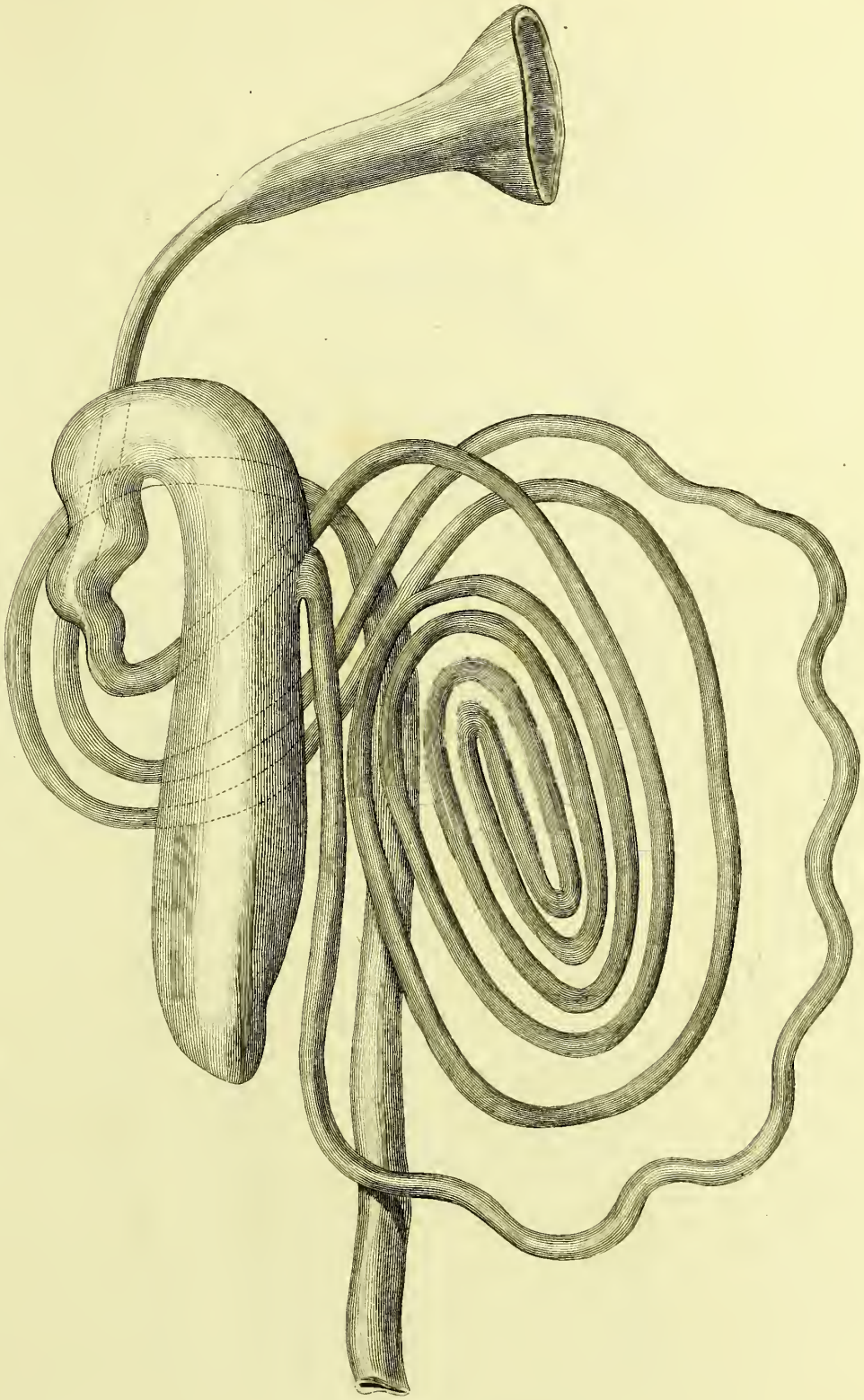


ANTILOPE.

W. Clift del.

T. Bauire sculp.

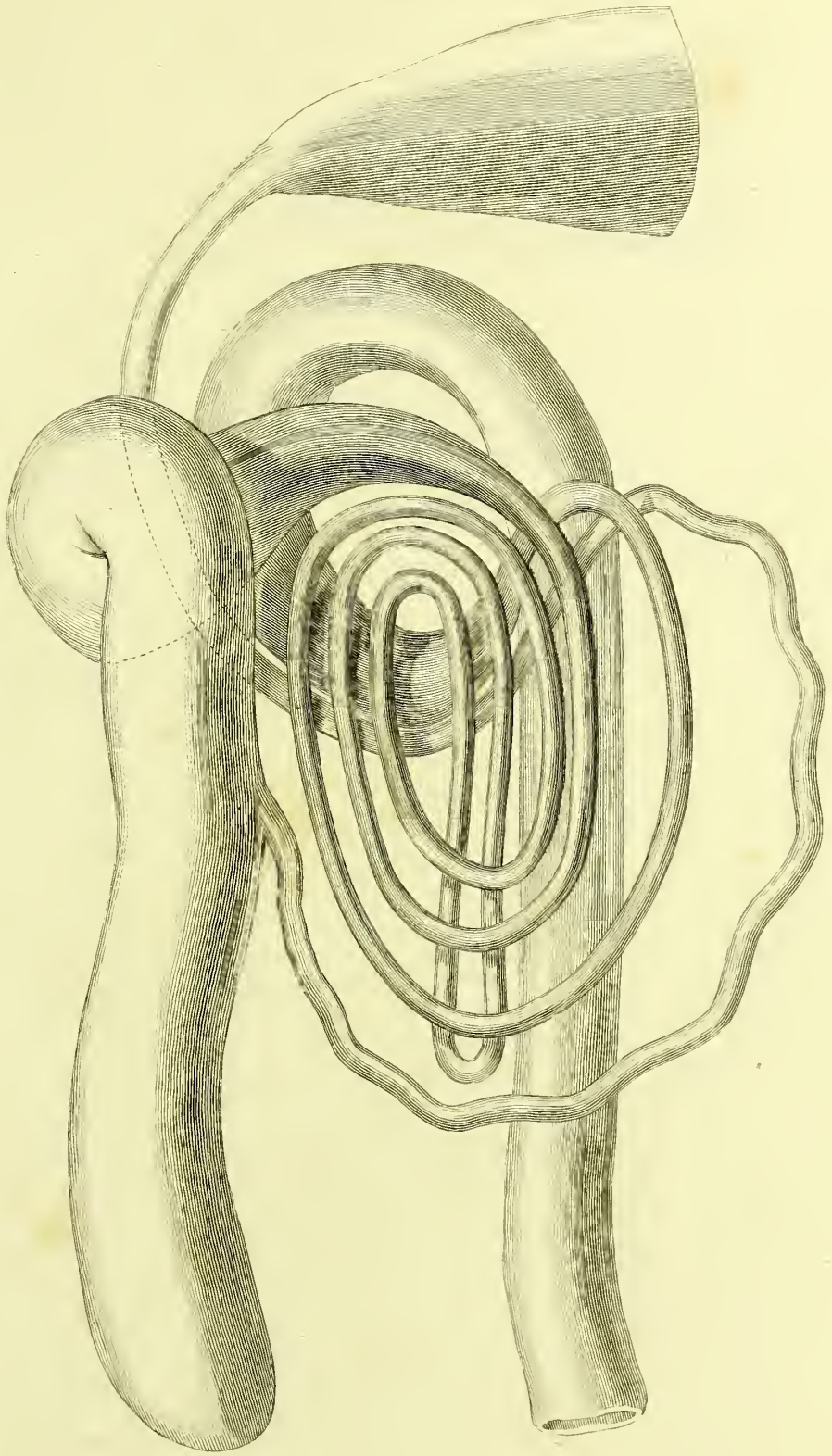
TAB. CXXVI.



CAROLINA DEER.

W. Clift del.

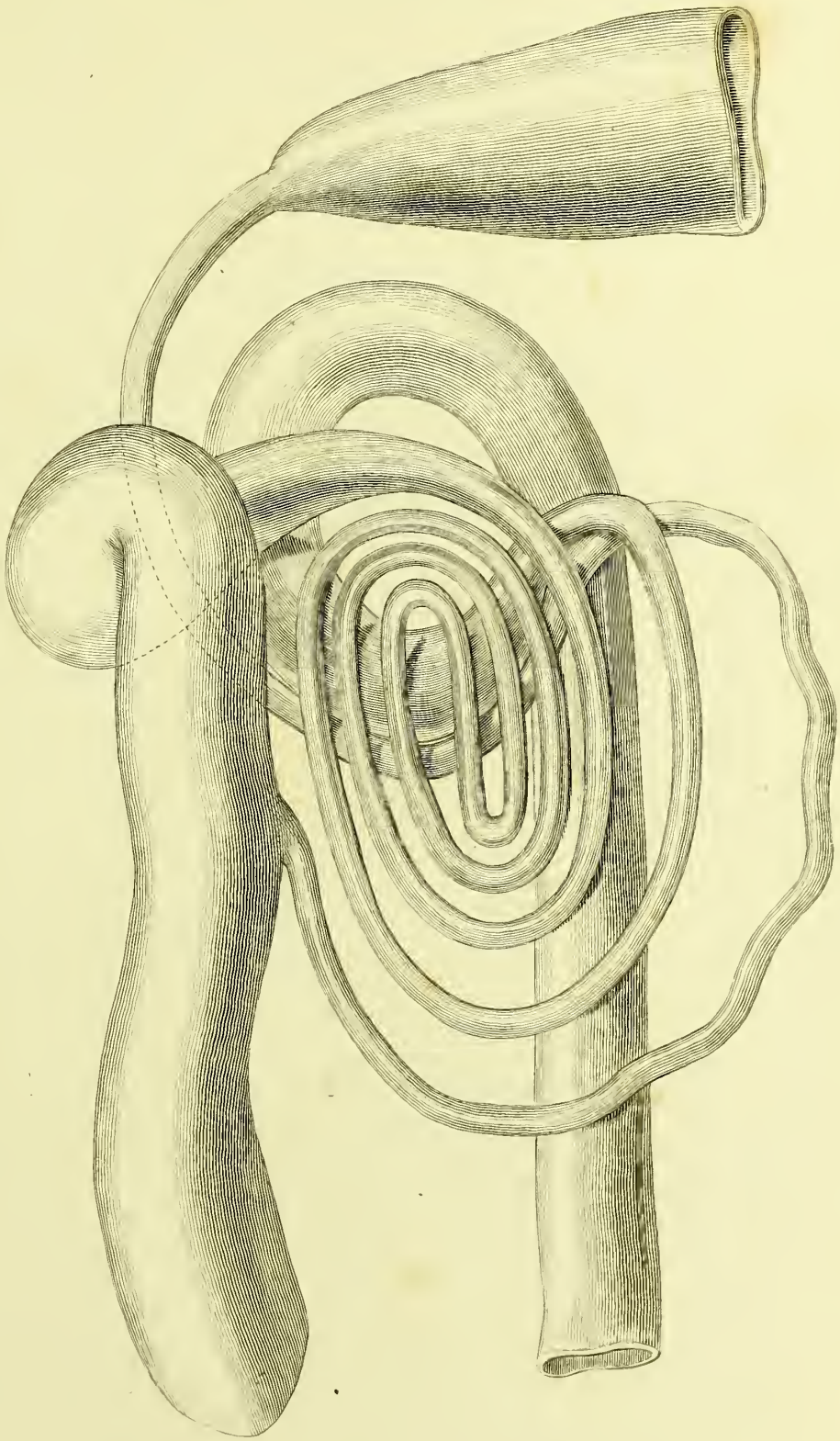
J. Basire sc.



DEER, PRINCE OF WALES'S ISLAND.

W.^m Clift del. Basire sc.

TAB. CXXVIII.

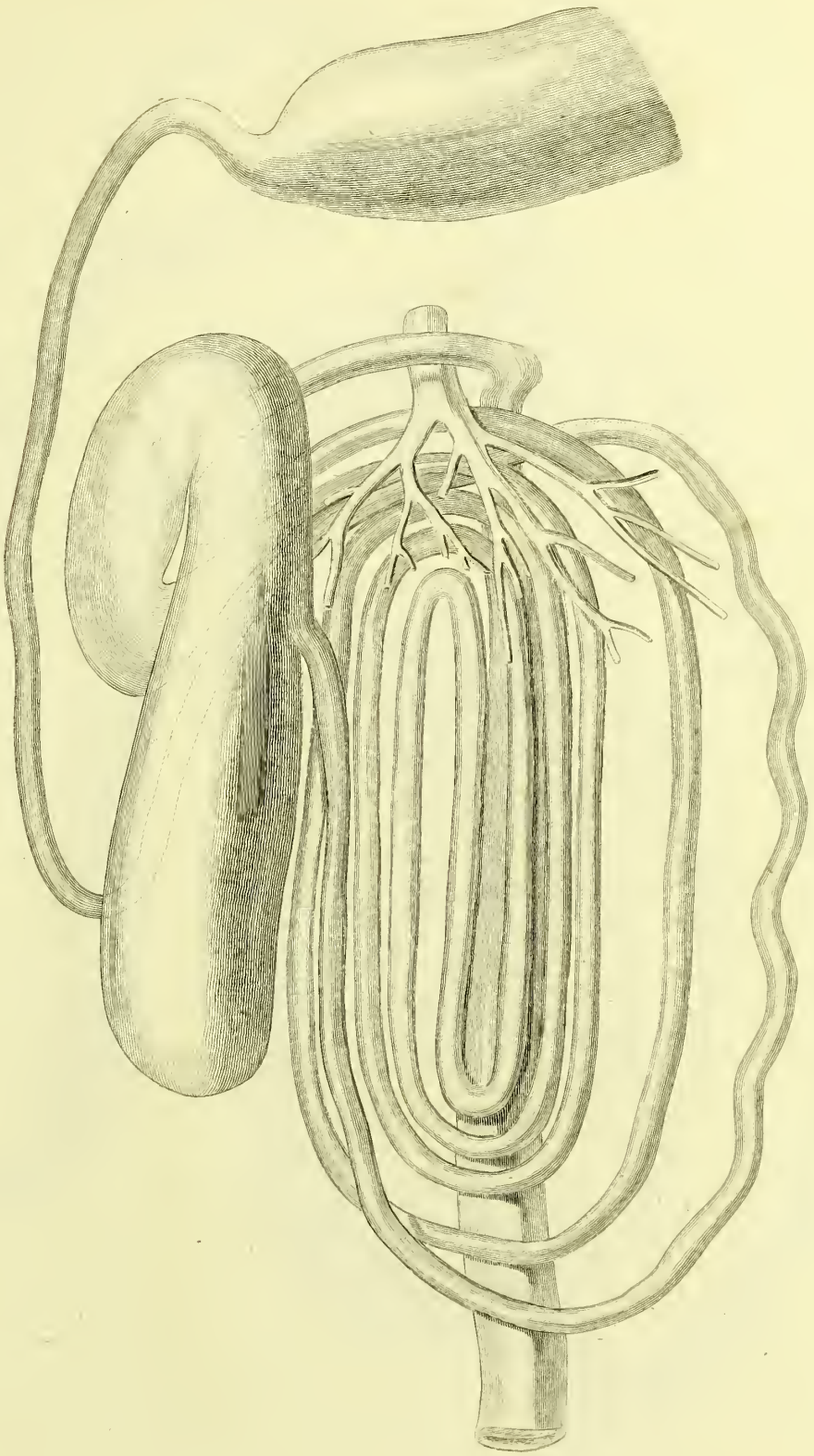


DEER, SMALLER SPECIES THAN TAB. CXXVII.

W. Clift del.

J. Basire sculp.

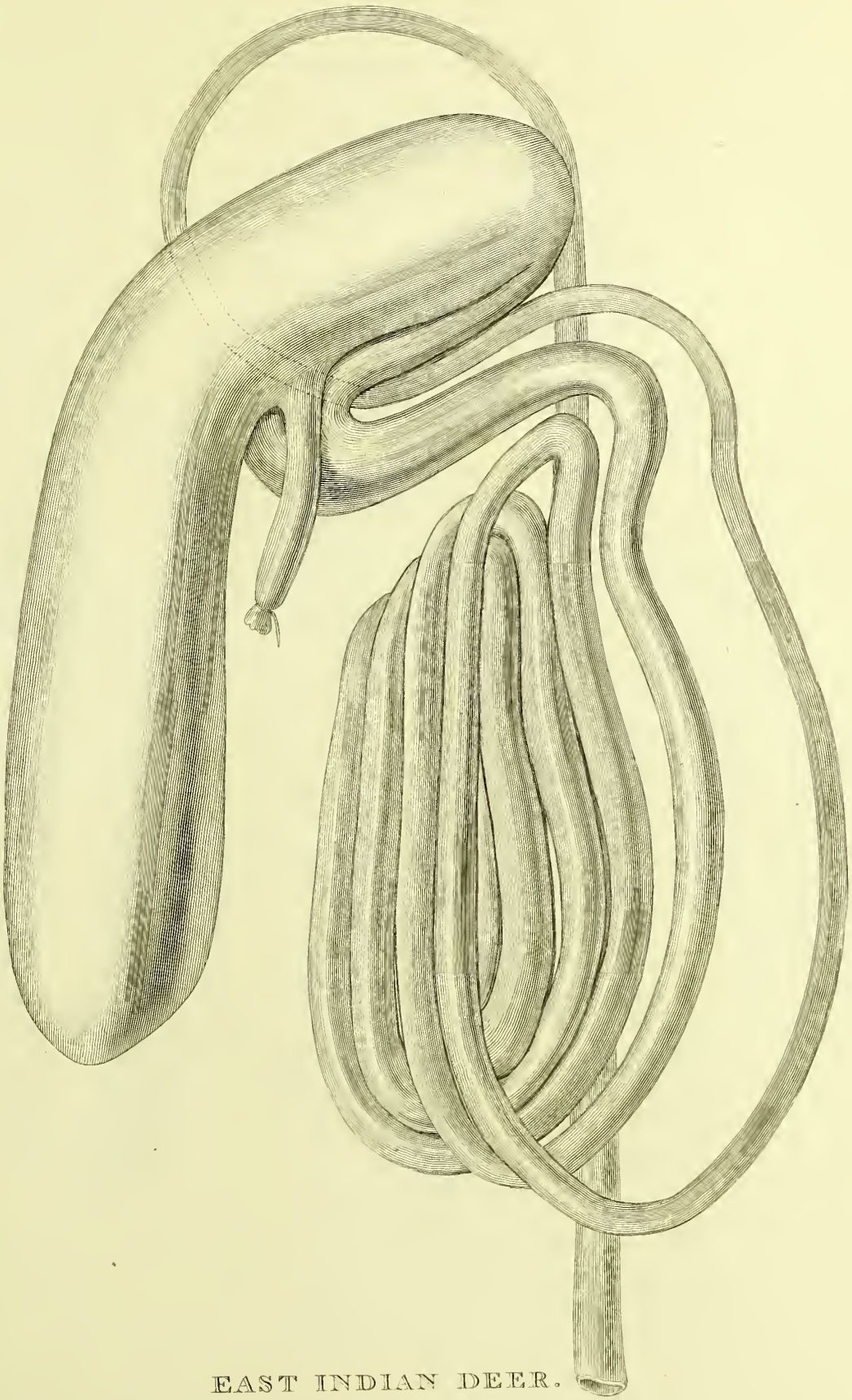
TAB. CXXIX.



HOG DEER.

W. Clift del. J. Basire sculp

TAB. CXXX.

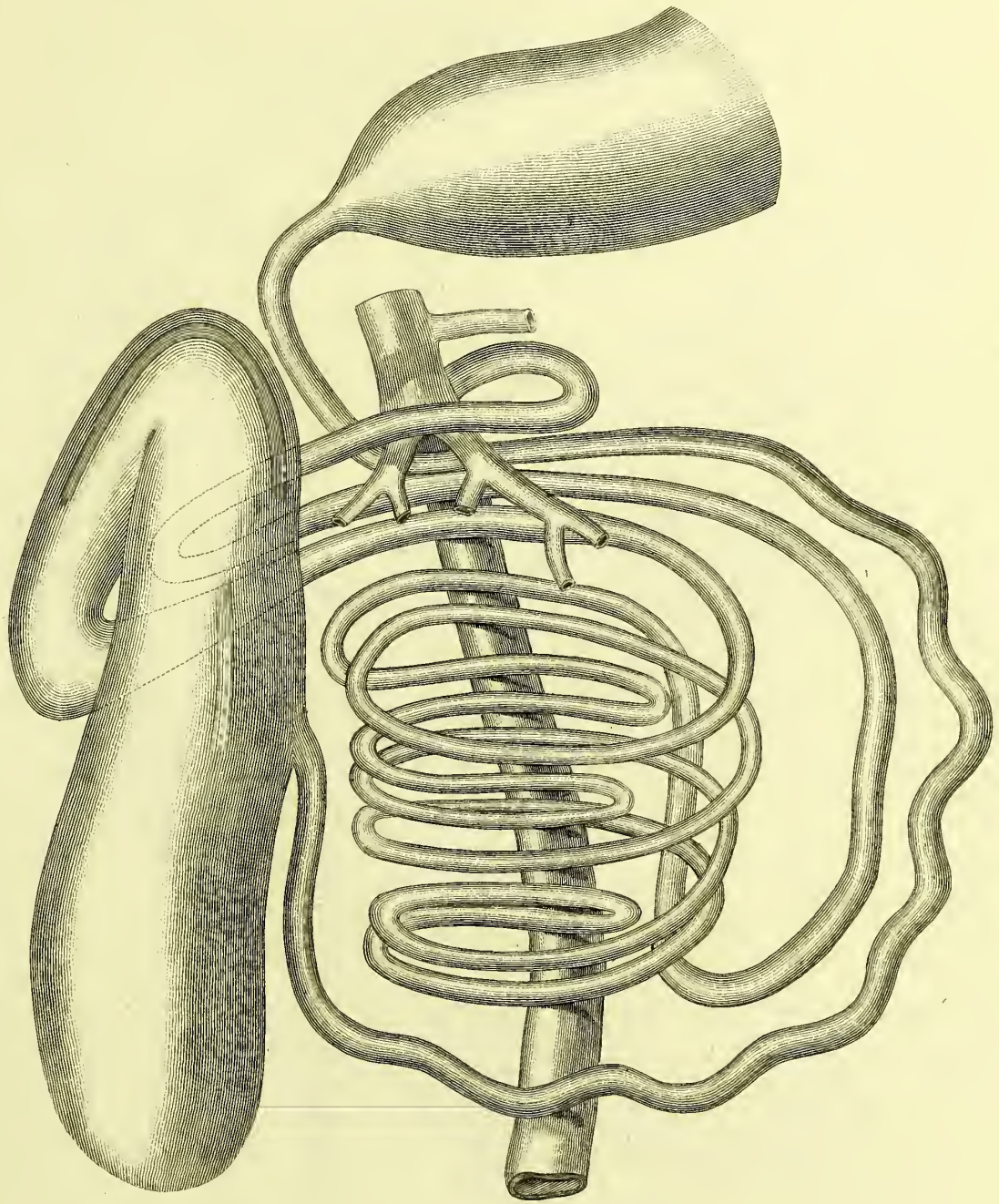


EAST INDIAN DEER.

W. Clift del.

J. Basire sculp.

TAB. CXXXI.

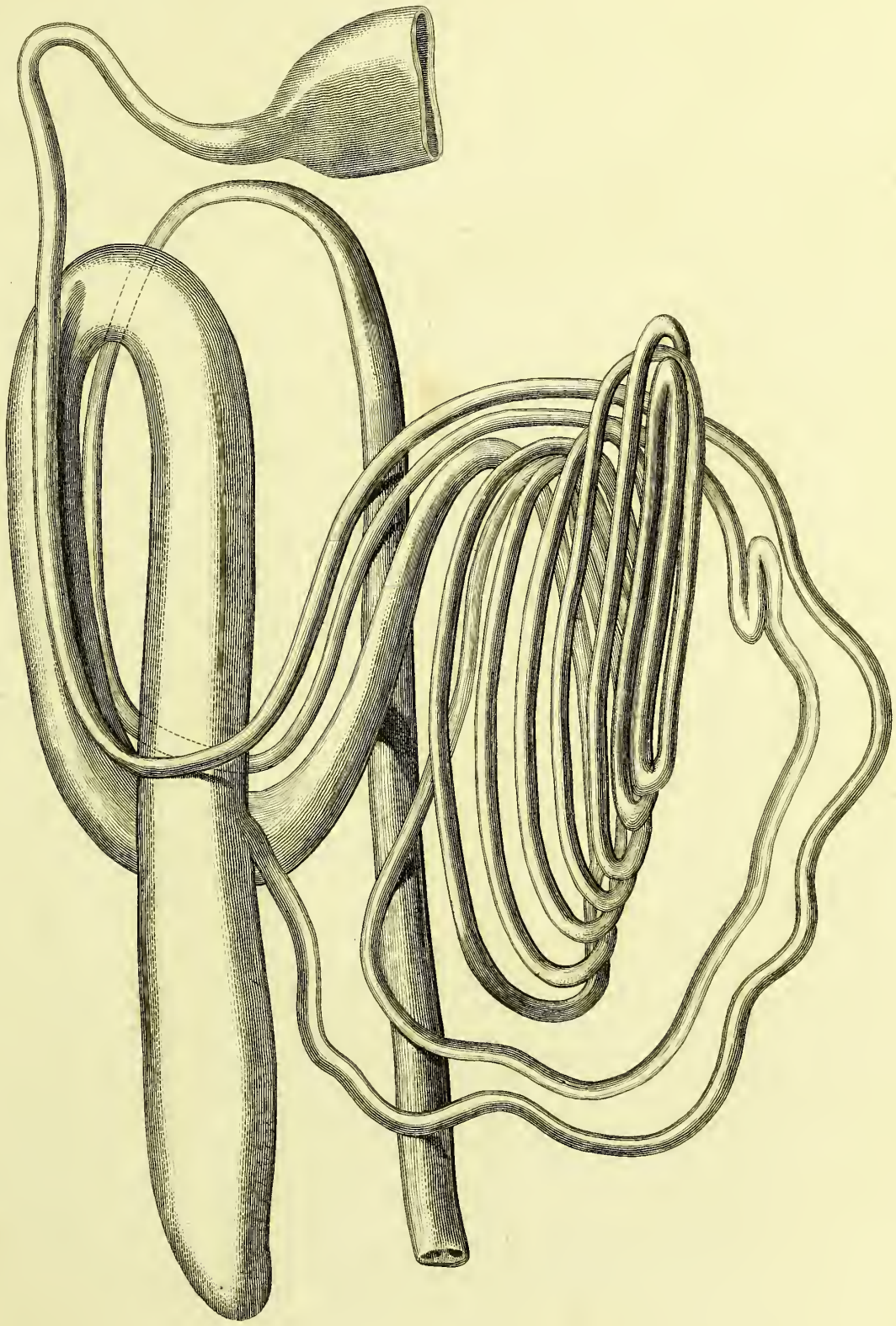


COMMON DEER.

W. Clift del.

J. Basire sculp.

TAB. CXXXII.



REIN DEER.

W. Clift del.

J. Basire sc.